DOCUMENT RESUME

ED 215 372 CS 206 889

AUTHOR Matheson, Carol
TITLE Writing as Problem Solving: Directions for Intervention.
PUB DATE Nov 80
NOTE 165p.; M.Ed. Thesis, Brock University. Table 2 may not be legible.

EDRS PRICE MF01/PC07 Plus Postage.
DESCRIPTORS Academic Aptitude; *Descriptive Writing; *Diagrams; Grade 7; Junior High Schools; *Prewriting; Problem Solving; *Student Attitudes; Teaching Methods; *Writing Instruction; Writing Processes; *Writing Research

ABSTRACT

A study examined whether using a tree diagram (a graphic, multidimensional classification device) as a prewriting organizer would provide students with a systematic method of searching for and organizing the content of their descriptive writing to meet some communication goal. One-hundred twenty-three seventh grade students were classified as above average, average, or below average language arts students on the basis of IQ and standardized test scores. The students were placed into two groups: three classes taught by the researcher and one class taught by another study staff member. From the two instructional groups, five students from each ability classification were randomly chosen, with the 15 students from the researcher's classes serving as the experimental group and those from the other staff member's class as the control. All 123 students were administered a writing attitude scale. The students in the control group were taught to write descriptive paragraphs by emulating good writers, while those in the experimental group were taught to use a tree diagram as a way of identifying the main attributes of an object to be described. The results showed that using the prewriting organizer significantly improved the quality of the experimental group students' descriptive writing. In addition, these students were found to have a more positive attitude toward writing. (Copies of tests used in the study are appended.) (FL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED215372

WRITING AS PROBLEM SOLVING:

DIRECTIONS FOR INTERVENTION

Carol Matheson

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Carol Matheson

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Department of Graduate and Undergraduate Education

(Submitted in partial fulfillment
of the requirements for the
degree of Master of Education)

College of Education
Brock University
St. Catharines, Ontario

November, 1980

CS206889

DEDICATION

To all those students who,
when confronted with a
composition task, ask,
"What will I say?"

C.J.M.
November, 1980

ACKNOWLEDGEMENTS

I owe a great debt to Dr. Len Popp who has contributed so generously and sensitively to my understanding of what education ought to be.

My thanks must go to Mr. John Cholvat, Research Officer with the Halton Board of Education, for the interest he has shown in this project and his patient supervision of the statistical analysis of the data.

I wish to acknowledge my appreciation to my teaching partner and friend Mr. Donald Dixon whose insights have contributed in large measure to the development of the instructional procedure presented in this paper.

To the grade seven students who were willing to work so hard to allow me to learn something of the mysteries of the composing process, I extend my gratitude.

Special thanks is extended to Carol Monteith for her expert typing of this paper.

ABSTRACT

The effect of using a tree-diagram as a pre-writing organizer for literary descriptive writing was tested in a pre test, post test, control group experimental design. Thirty, randomly selected above average, average and below average grade seven Language Arts students took part in the study. A t-test analysis of the mean scores of the post test paragraphs revealed a statistically significant difference between the composing performance of the treatment and control groups on General Impression, Thought Organization, and Descriptive Elements employed. An analysis of covariance showed no significant difference between the post test scores of below average treatment and control students on Thought Organization. A greater emphasis in the instructional sequence on communication of organized content may be needed for these students.

It was further hypothesized that treatment students using the tree-diagram would have a more positive attitude toward writing than the control students who were taught to write by emulating skilled writers. A semantic differential attitude survey was administered to the 123 students comprising both instructional groups. The treatment group tended to be generally more positive about writing.

TABLE OF CONTENTS

		Page
DEDICATION		ii
ACKNOWLEDGEMENTS		iii
ABSTRACT		iv
TABLE OF CONTENTS		v
LIST OF TABLES		viii
LIST OF FIGURES		ix
CHAPTER		
I	INTRODUCTION	1
	Impetus for the Study	1
	An Overview of Composing Research	2
	Purpose of the Paper	5
	Research Hypotheses	6
II	WRITING AS PROBLEM SOLVING	8
	Introduction	8
	New Goals for Writing	8
	Overview of Learning	10
	Analysis of the Skill Domain	11
	Problem Solving in Detail: Introducing Organizers	13
	Problem Solving and Writing	20
	Initial Experiences Stage Comparison	24
	Question Stage Comparison	27
	Synthesis Stage Comparison	29
	Assessing the Conclusion Stage Comparison	30
	Expressing the Conclusion Stage Comparison	31
	Evaluation Stage Comparison	32
	Alternatives and Data Collection Stage Comparison	34
	Content	34
	Organization	37
	Summary	40
III	PREFACE TO THE STUDY	41
	Introduction	41
	Genre Related Organizers	43
	The Combined Effect of Goal and Organizer	48
	Initial Experience	48
	Question	49
	Alternatives	49
	Data Collection	49
	Conclusion	51
	Assessing the Conclusion	51
	Communication	51
	Evaluation	53
	Other Problem Solving Approaches to Writing	55

IV PROCEDURES FOR STUDY 59
Sample of Subjects 59
Attitude Survey Sample 60
Group Treatments 60
Control Group 60
Treatment Group 61
Attitude Survey Group 63
Measurement for Hypothesis 1, 2 and 3 63
Variable Explanation 64
General Impression 64
Thought Organization 64
Main Impression 64
Sub-Categories 65
Sub-Sub-Categories 65
Descriptive Elements 66
Active Verbs 66
Specific Nouns 66
Adjectives 66
Adverbs 66
Phrases 66
Clauses 66
Similes and Metaphors 66
Inter-Rater Reliability 67
Study Scoring Procedure 67
Measurement for Hypothesis 4 68
Data Treatment 69
Statistical Hypothesis 1 69
Statistical Hypothesis 2 69
Statistical Hypothesis 3 69
Statistical Hypothesis 4 70

V IMPLEMENTATION OF THE TREE-DIAGRAM ORGANIZER . . . 72
Instructional Sequence 72
Student Activities 72
Procedure 87

VI RESULTS 88
T-Test Analysis 88
Hypothesis 1 88
Hypothesis 2 88
Hypothesis 3 89
Analysis of Covariance 89
Strength of Effect of Program 90
Attitude Survey 91
Hypothesis 4 91
Discussion 93

VII SUMMARY AND CONCLUSIONS 97
Summary 97
Conclusions 98
Implications for Further Research 99

BIBLIOGRAPHY 101

APPENDICES 105

Appendix 1. Completed Tree-Diagram Organizer For Picture Used For Treatment Group Post Test Descriptive Paragraphs 105
Appendix 2. Samples of Pre and Post Test Descriptive Paragraphs For Control and and Treatment Groups 113
Appendix 3. Scoring Sheet For Holistic and Analytical Evaluation of Control and Treatment Group Descriptive Paragraphs on Three Variables . . . 120
Appendix 4. Writing Attitude Survey Questionnaire . . 122

LIST OF TABLES

		Page
1.	LEARNING OUTCOMES CATEGORIES	10
2.	A COMPARISON MATRIX SHOWING THE RELATIONSHIP BETWEEN STAGES OF PROBLEM SOLVING AND OBSERVED STAGES OF THE COMPOSING PROCESS	22
3.	INSTRUCTIONAL SEQUENCE FOR TEACHING THE USE OF THE TREE-DIAGRAM ORGANIZER FOR LITERARY DESCRIPTIVE WRITING.	73
4.	STUDENT ACTIVITIES CORRESPONDING TO STEPS IN THE INSTRUCTIONAL SEQUENCE FOR TEACHING THE USE OF THE TREE-DIAGRAM ORGANIZER FOR LITERARY DESCRIPTIVE WRITING.	75
5.	A PROCEDURE FOR USING THE TREE-DIAGRAM ORGANIZER FOR LITERARY DESCRIPTIVE WRITING	87
6.	SUMMARY OF RESULTS OF T-TEST OF PRE AND POST TEST MEAN SCORES ON GENERAL IMPRESSION FOR TOTAL TREATMENT AND CONTROL GROUPS	88
7.	SUMMARY OF RESULTS OF T-TEST OF PRE AND POST TEST MEAN SCORES OF TREATMENT AND CONTROL GROUPS ON THOUGHT ORGANIZATION	89
8.	SUMMARY OF RESULTS OF T-TEST ANALYSIS OF PRE AND POST TEST MEAN SCORES OF TREATMENT AND CONTROL GROUPS ON DESCRIPTIVE ELEMENTS	89
9.	SUMMARY OF POST TEST RESULTS OF ANALYSIS OF COVARIANCE ON THREE VARIABLES FOR THREE ABILITY SUB-GROUPS USING THE APPROPRIATE PRE TEST SCORE AS COVARIATE.	90
10.	SUMMARY OF RESULTS OF PER CENT OF POSSIBLE LEARNING FOR WHOLE TREATMENT GROUP AND THREE ABILITY SUB-GROUPS ON THREE VARIABLES.	91
11.	SUMMARY OF RESULTS OF CHI SQUARE ANALYSIS OF FREQUENCY DISTRIBUTION OF RESPONSES OF TREATMENT AND CONTROL GROUPS TO THE SEMANTIC DIFFERENTIAL ATTITUDE SURVEY	92
12.	SUMMARY OF RESPONSES OF TREATMENT AND CONTROL GROUPS ON ATTITUDE SURVEY CONCERNING WRITING AND PLANNING	95

LIST OF FIGURES

		Page
1.	THINKING SKILLS MODEL	12
2.	BASIC INQUIRY MODEL	14
3.	INFORMATION ORGANIZERS	15
4.	SERIATION GROWTH SCHEME	44
5.	CLASSIFICATION GROWTH SCHEME	46
6.	TREE-DIAGRAM ORGANIZER FOR KITTEN DESCRIPTIVE PARAGRAPH SHOWING CATEGORIES, SUB-CATEGORIES AND SUB-SUB-CATEGORIES	49
7.	SUB-SUB-CATEGORY "EARS" OF THE KITTEN TREE-DIAGRAM SHOWING THE LANGUAGE COLLECTED TO IDENTIFY PHYSICAL, BEHAVIOURAL AND ENVIRONMENTAL ATTRIBUTES	50

CHAPTER ONE

INTRODUCTION

IMPETUS FOR THE STUDY

When this writer returned to teaching several years ago, Charles Silberman had just published Crisis in the Classroom and interest in the informal approach to education as practised in British primary schools was widespread. When the proponents of this educational philosophy visited to present their rationale for teaching in an open manner, they brought with them samples of children's work. Among them were examples of superior student compositions. One was immediately struck, not by the correct use of spelling and punctuation, but by the sensitive and insightful way the children dealt with their subjects. A search began for ways to promote this kind of writing in our own students.

At the same time it was the responsibility of the primary teachers in our jurisdiction to implement a new Environmental Studies core document which espoused an educational philosophy that children learn by doing. Rather than test for retention of specific knowledges the decision was made to evaluate the growth of cognitive skills of students exposed to the new programs.

It was while designing and implementing thinking skills activities into the Environmental Studies curriculum that once again attention was sharply focused on the composing process of young children. In the new programs students were taught to organize information in simple classification charts, Venn diagrams, cross-classification charts and tree-diagrams. When they communicated these ideas in written form their compositions began to show the richness of content that was being sought.

Further, it was not uncommon for primary boys, who were unconsciously being labelled as having "learning problems", to demonstrate in their written work a surprising ability to think. It became abundantly clear that in writing, improved product had to be preceded by improved process. Teachers became aware that they knew very little about the thinking process required to produce a piece of written work.

AN OVERVIEW OF COMPOSING RESEARCH

Reviews of research in composition reveal that past investigations have been concerned primarily with product. (Park, 1961; Braddock, Lloyd-Jones and Schoer, 1963; Meckel, 1963).

Generally, the works cited in these reviews deal with such interests as the effect on student writing of materials, methods of presentation, linguistic environment, student maturation, the teaching of grammar, and increased practice. Combined with other forces, this direction for research resulted in producing teacher intervention in writing, largely at the sentence level, concentrating mainly on correct usage. (Cooper, 1975). Teachers have intervened very well at this level, but unfortunately, such intervention completely ignores the very essence of written communication which is the presentation of personal ideas and feelings to some audience for a meaningful purpose. (Squire, 1975). Recent research concerned with the evaluation of writing at the Intermediate level in Ontario has found that students tend not to have severe problems with spelling, punctuation and grammar. These errors appear not to be widespread but tend to be concentrated in individual compositions. Some errors, such as subject-verb agreement and sentence fragments which have long been held to be major problems, were found to be largely non-

existent. The major weaknesses displayed by students were the quality and the organization of ideas. (Haynes, 1979).

According to Cooper and Odell (1978), an underlying assumption of past pedagogical research was that educators already possessed a knowledge of what constituted the writing process. However, when the precepts of contemporary composition textbooks were tested by the systematic examination of published works and by the interviewing of skilled writers, the maxims were found to be invalid. Suggested methods of paragraph development, use of topic sentences and outlining strategies tended not to be used by successful authors.

As yet, there is very little research evidence related to the cognitive processes involved in composing. No universally accepted writing process model has been presented.

Generally, the writing process has been divided into three broad phases: prewriting, writing and rewriting. They are described as follows:

1) Prewriting: the period in which a writer familiarizes himself with and organizes information about a topic.
2) Writing: the actual transcription of the communication.
3) Rewriting: any revision of content form or language.

The weakness of this division is its lack of specificity in identifying what a writer actually does while composing.

The most detailed characterization of the entire writing process thus far, has been presented by Janet Emig (1971) who described what grade twelve students did while composing out loud. As revealing as her description is, it does not identify conclusively the cognitive processes involved in writing.

Carl Bereiter (1978) has proposed a composing process model in which writing is going on at four levels: intention, strategy, content and language. It appears to be the only model that is supported by a systematic and comprehensive body of research that delineates what writers do mentally at different stages of composing. (Bereiter and Scardamalia, 1979).

Bereiter and Scardamalia (1978) believe that if teacher intervention is to bring about qualitative changes in student writing it must:

1) shift the emphasis from stimulus to consequences; and
2) direct conscious attention to parts of the writing process that are normally unconscious; and
3) promote student recognition of faulty strategies presently used; and
4) teach cognitively functional strategies; and
5) teach metacognition (a person's knowledge of his or her cognitive processes).

Much teacher effort, in current writing instruction, is concerned with creating an atmosphere conducive to writing, presenting stimulating topics and having students engage in pre-writing activities which aim at providing information and motivating them to write about it. As valuable as this stimulus emphasis may be, teachers are more likely to promote growth in student writing if they concentrate on providing composing tasks in which consequences motivate the writer.

Consequential writing tasks, Bereiter and Scardamalia state, focus pupil attention naturally on parts of the composing process of which they are often unaware and which, many times, present

students with difficulties while writing. In order to help students master the difficulties, consequential writing tasks call for the use of strategies which make the successful completion of the task a consequence of acting in a specified way.

Further, Bereiter and Scardamalia identify another principle of cognitively based instruction to which teachers must attend. It is the teacher's role to identify for students any inefficient strategies they unconsciously use and instruct them in the use of those that direct conscious and selective attention to sub-processes contained within the composing act. This necessitates teaching children a model for writing. The metacognitive knowledge thus provided permits students to recognize the various stages of the writing process and identify the cognitive skills that are used at each stage.

PURPOSE OF THE PAPER

In an attempt to bring about qualitative changes in the literary descriptive paragraph writing of Intermediate students, this paper proposes a planning strategy that will allow pupils to consciously and sequentially attend to:

1) purpose for writing; and
2) a global search for and organization of content; and
3) appropriate and effective language choice.

It is hypothesized that the tree-diagram, a graphic, multi-dimensional classification device, will provide students with a systematic way of searching for and organizing the content of their descriptive paragraphs to meet some communication goal.

In addition, an instructional sequence for teaching the use of the tree-diagram as a planning strategy is suggested. A procedure

which directs Intermediate students to employ the strategy is also included.

RESEARCH HYPOTHESES

As primary outcomes of investigating the use of the tree-diagram as an organizer for literary descriptive writing, the following research hypotheses were formulated.

Hypothesis (1): the literary descriptive paragraph writing of students using the tree-diagram as a pre-writing organizer will make a more favourable general impression on the reader than those of students emulating good writers.

Hypothesis (2): of the two modes of learning to write a literary descriptive paragraph, using a tree-diagram as a pre-writing organizer or emulating good writers, those students using the tree-diagram will show enhanced capability in thought organization.

Hypothesis (3): of the two modes of learning to write a literary descriptive paragraph, using a tree-diagram as a pre-writing organizer or emulating good writers, those students using the tree-diagram will show enhanced capability in the use of descriptive elements.

These hypotheses were tested on the following groups:

a) total group
b) above average subjects
c) average subjects
d) below average subjects.

As a secondary outcome of being instructed in the use of a procedure which employed a planning strategy, the students in the treatment group would have more positive feelings toward a school-

assigned writing task than those who did not approach composing in this way. As a result, the following research hypothesis was formulated.

Hypothesis (4): students using the tree-diagram as a pre-writing organizer will show a more positive attitude toward writing than students emulating good writers.

CHAPTER TWO

WRITING AS PROBLEM SOLVING

INTRODUCTION

New sophisticated ends toward which writing instruction must aim will be explored in this chapter. In an attempt to discover how teachers can attain these goals an overview of learning will be presented with special emphasis on the skill domain. The cognitive processes involved in complex intellectual performance will be compared to those utilized during composing in order to establish that writing is a specific case of problem solving.

NEW GOALS FOR WRITING

Young, Becker and Pike (1970) in tracing Western rhetorical tradition have noted the forces in society which have brought a different emphasis to the discipline. The influences that they discern continue to the present and still shape instruction in schools today. These authors contend that the teaching of writing is concerned chiefly with the use of eloquent language rather than content. They state that writing focuses on clarity of statement, emphasis, coherence and correct usage for the purpose of "skillful verbal coercion", rather than on discovery of truth, as perceived through the collective eyes of a culture to be skillfully communicated for the purpose of much needed cooperation among peoples. James Moffet (1979) supports Young, et al. and says that societal changes have been responsible for a materialistic definition of writing which has reduced the teaching of it to a low level. Thus the social outcry at the poor student performance in the discipline. Moffet points out that writing serves mainly as a test of comprehension from the book review in elementary school to the survey of the literature in graduate studies.

Instruction centres on "craftsmanship", in the construction of good sentences, paragraphs and the concern for overall organization. Much attention is given to the superficial features of the product such as spelling, punctuation, capitalization and grammar which unfortunately have been construed as the basics. However, Moffet clearly states that writing should be a manifestation of thought and that instruction should aim at fostering the "authorship" of original thinking.

The current instructional climate does not permit students to regard school writing as intimately related to observing, experimenting and discovering. (Britton, Burgess, Martin, McLeod and Rosen, 1975). Students quickly learn that what pleases the teacher is of major importance. They see writing largely as a way of recording what others say and as a means of testing this knowledge. Rarely, in the school setting, do students view their writing as an opportunity to air and explore new ideas. Seldom is it regarded by them as an expression of their independent thought.

According to Carl Bereiter (1978), writing instruction in schools seems to stall at the point of teaching students to integrate correct use of mechanics and accepted elements of style with their presentation of ideas as they occur to them. Bereiter believes that instruction should aim to help students develop the epistemic potential of writing. By so doing, he explains, "writing comes to be no longer merely a product of thought but becomes an integral part of thought".

Clearly, all the above discussions of aims for writing instruction demand that the teaching of writing focus on the process of

complex intellectual functioning.

In order to begin to understand complex intellectual functioning it is instructive to identify its place in an overview of learning.

OVERVIEW OF LEARNING

At the end of the formal instructional period in a student's life the learnings he has acquired or at least to which he has been exposed are shown in Table 1. The learnings range from simple to complex levels within each strand and are intimately related across the three domains.

TABLE 1

LEARNING OUTCOMES CATEGORIES

KNOWLEDGE	SKILLS	AFFECT
Systems: relationships among theories ↑ Theories: relationships among principles ↑ Principles: relationships between/among concepts ↑ Concepts: classes of facts ↑ Facts: basic units of knowledge	Complex Intellectual Operations: problem solving ↑ Integrated Operations: basic cognitive skills used together ↑ Basic Operation: basic cognitive skills (correspondence-classification-seriation ↑ Observation)	Traits: Behaviours which define personality ↑ Values: criteria used in decision making ↑ Beliefs: affect laden principles ↑ Attitudes: affect laden concepts ↑ Likes: affect laden facts or actions

Information about characteristics of objects and events in the environment is taken in through the senses and conceptualized by classifying them according to similarities. Generalizations

(principles) are made about concepts as consistent relationships among them are observed. These observed "truths" are clustered together as a theory in an attempt to explain complex phenomena. Whole bodies of knowledge, (systems) are built of theories developed to explain the same phenomena as they occur in varying contexts.

The feelings and emotions, both positive and negative, experienced through interaction with the world as knowledge is gathered, form the likes, attitudes, beliefs and values which influence decisions to behave in consistent ways in given situations.

ANALYSIS OF THE SKILL DOMAIN

The skill domain is of major interest for the purpose of examining sophisticated thinking. The Thinking Skills Model (Popp, Robinson, Robinson, 1974) provides a more detailed description of the hierarchical nature of the cognitive domain as it traces thinking from basic operations through integrated skills to complex intellectual performance. (Figure 1).

The basic thinking skills that are used to act upon information are surprisingly few. Observation is the ability to differentiate and coordinate the information about the world discovered through all the senses. Correspondence is the skill involved in the matching of objects and events. The grouping of objects according to similarities, Classification, allows an individual to react to an object or event in the environment in terms of a class of instances, thus reducing the cognitive load.
Seriation deals with the ordering of objects and events according to differences along some dimension.

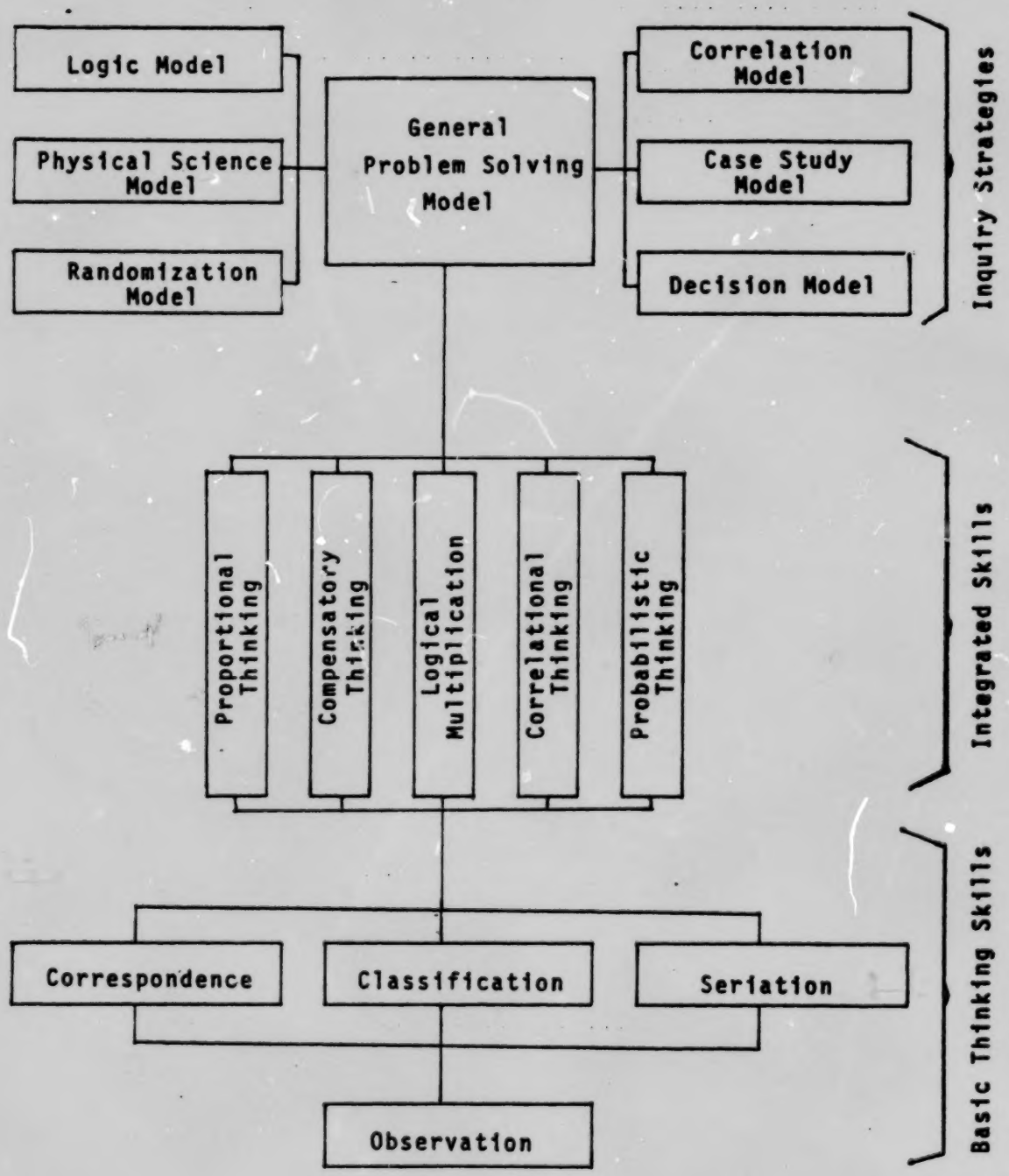


Figure 1: The Thinking Skills Model showing the increasingly complex levels of thinking from utilization of basic cognitive skills to complex thinking represented by problem solving.

If children do not have enough opportunity to practice these skills at the concrete level, difficulties often arise in traditional school tasks such as, finding the main idea in a paragraph, which utilizes these cognitive capabilities at an abstract level.

The next most complex set of thinking abilities is the Integrated Skills. Ratio situations demand Proportional Thinking in order to determine the magnitude of groups in relation to each other. Compensatory Thinking deals with the idea of balance and changes of balance within any system while Logical Multiplication, as more complex classification, and seriation looks at objects or events along more than one dimension at the same time. Correlational Thinking is concerned with the direction and strength of the relationship among variables. It allows individuals to account for those instances that do not follow the general trend. The determining of the likelihood of a particular event occurring is involved in Probabalistic Thinking. Each of the Basic and Integrated skills can be further described in individual hierarchical strands moving from simple to complex.

PROBLEM SOLVING IN DETAIL: INTRODUCING ORGANIZERS

Problem solving represents the thinking done by sophisticated performers in any complex context.

An assumption of the work done by Popp, et al. (1974) is that all problem solving, no matter what the discipline, is more similar than dissimilar. Therefore, the General Problem Solving Model represents complex intellectual performance at its simplest, useful level. The level of sophistication of the inquiry questions or focus dictates the way in which information is organized.

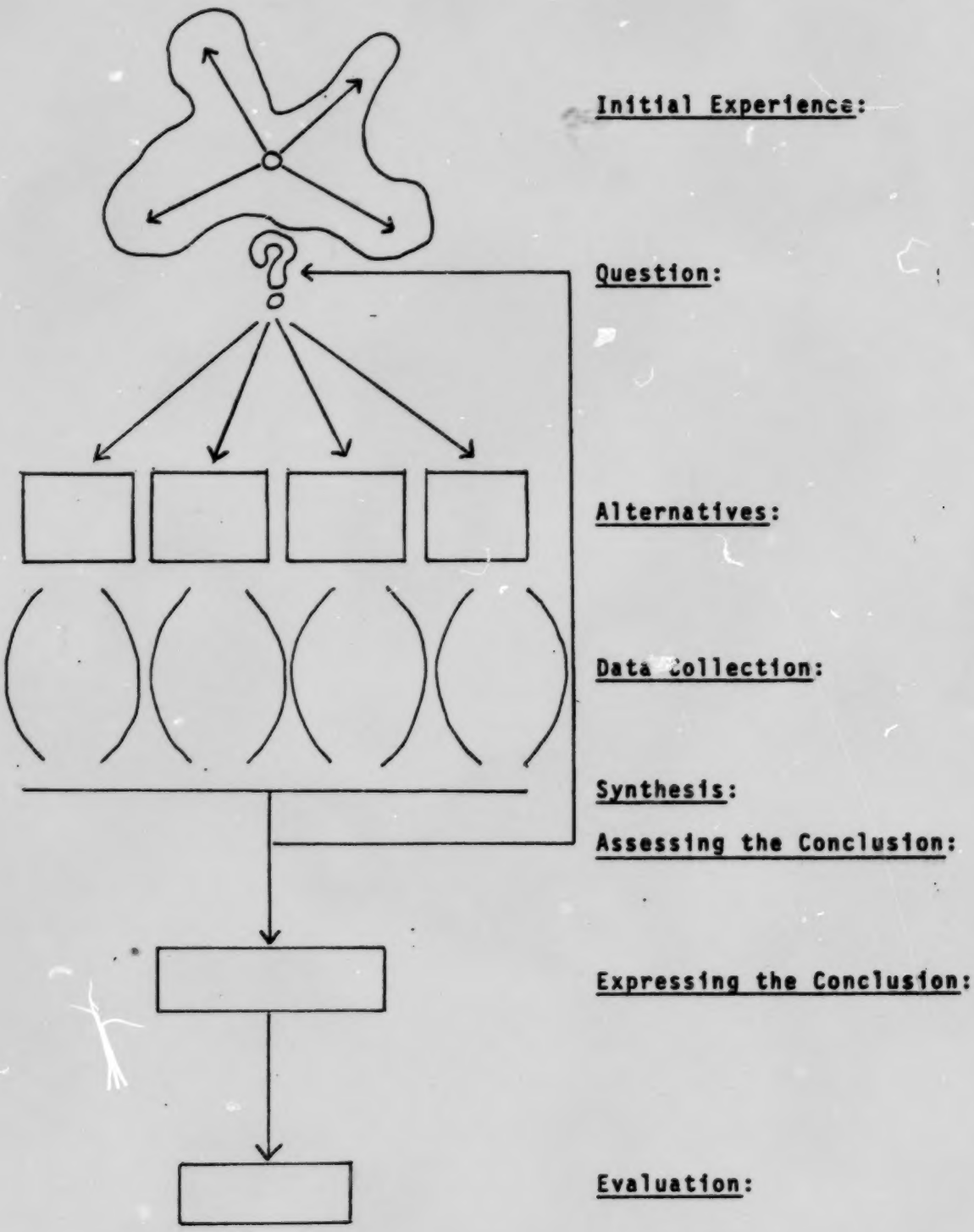


Figure 2: The Basic Inquiry Model showing the various stages of problem solving that require the focusing of attention and the application of specific knowledges and skills.

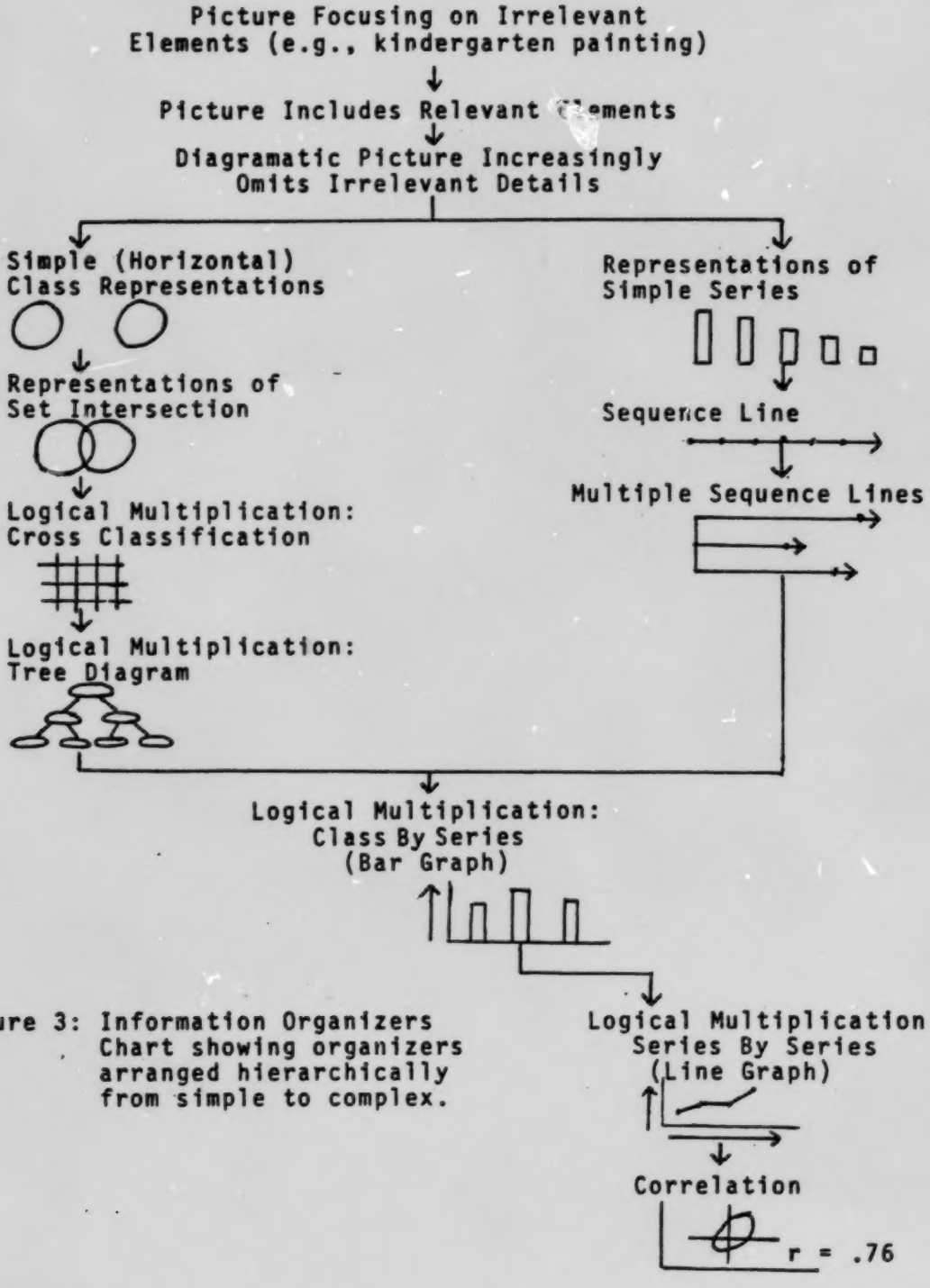
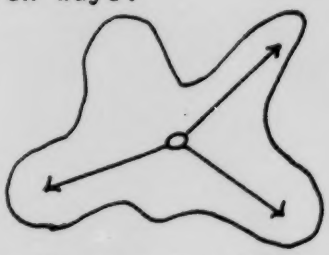

Picture Focusing on Irrelevant Elements (e.g., kindergarten painting)
Picture Includes Relevant Elements
Diagramatic Picture Increasingly Omits Irrelevant Details
Simple (Horizontal) Class Representations
Representations of Set Intersection
Logical Multiplication: Cross Classification
Logical Multiplication: Tree Diagram
Representations of Simple Series
Sequence Line
Multiple Sequence Lines
Logical Multiplication: Class By Series (Bar Graph)
Logical Multiplication: Series By Series (Line Graph)
Correlation
r = .76

Figure 3: Information Organizers
Chart showing organizers arranged hierarchically from simple to complex.

The variation in the complexity of ideational organization lends power to the process and permits its application to any context.

A more precise understanding of complex thinking can be gained from a detailed examination of the General Problem Solving Model or Basic Inquiry Model. (Banks et al., 1978) Although the stages of the Basic Inquiry Model, as presented in Figure 2, appear to give the impression that each stands alone, isolated from the others, that is only for ease of analysis and communication. Problem solving is not a linear procedure. In practice the process is recursive and most often involves a "flipping" back and forth between stages as the discovery process unfolds. As well, each stage holds the potential for growth and can be dealt with in increasingly complex ways.



The "Initial Experience" stage requires the utilization of all basic thinking skills.

Observation skills, performed at various levels of abstraction, permit the identification of obvious and less obvious attributes of objects and events in the environment.

At this point the learner differentiates between the known and unknown, familiar and unfamiliar and recognizes and describes discrepancies or contradictions in information. A knowledge base of any topic of interest is established by the classification of commonalities to form concepts.

The question stage is reached when the unfamiliar and inconsistent instances cause the learner to wonder. A focus is clarified for further investigation because the question states the relationships among concepts precisely. The question admits the possibility of several answers, demands the use of facts to support or reject the possible answers and is manageable in terms of time and resources.

In generating alternative answers to a question the problem is operationalized. This stage allows for creative solutions to a problem within the limitations of suggesting reasonable answers.

Data relevant to each possible answer are collected and organized in an appropriate way, dictated by the number and complexity of the concepts in the question. This collection process may, in fact, prompt the posing of other alternatives not identified by initial experiences with the topic. The relationships that are revealed among the data may result in the reformulation of the question and cause the information search to go in different directions.

It is at this stage that richness and power are built into the problem solving process by the use of a set of information organ-

izers. They graphically illustrate the integration of the basic cognitive operations, observations, classification seriation and correspondence. Figure 3 shows the information organizers presented sequentially from a simple, pictorial representation of information to a sophisticated graphic presentation of correlational relationships. (Popp, 1978). The left-hand strand shows the development of classification ability, while the right-hand strand depicts that of seriation. The two skills combine in bar and line graphs, scattergrams, and representations of correlational relationships. Each organizer is shown in its simplest form but it is understood that complexity can be built into each one in a horizontal growth sequence.

The organizers are an attempt to visually represent what neuroscientists and others are coming to believe goes on in the mind of a problem solver as he seeks answers to his concerns. The brain is no longer considered as a switchboard between stimulus and response. Hebb's theory of thought and later work by Newell, Shaw and Simon suggest that experiences tend to be organized in the brain in patterns as "cell assemblies" or "phase sequences". (Hunt, 1961). Further support for using organizers in problem solving comes from the work done in psychology on human information processing. Just as there are processes involved in organizing and structuring perceptual information into internal representation of the world so that consequences of an action can be determined without actually engaging in the action, so it is believed that procedures for searching for solutions may also be internalized. (Lindsay and Norman, 1972). The brain, it is theorized, tends not to deal with information in algorithmic step-

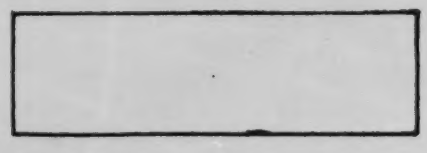
by-step logic but by perceiving patterns, and learning is defined, in this view, as the acquisition of useful programs. (Hart, 1978).

A synthesis of the accumulated information leads to a statement of the most reasonable solution to the problem. Suitable criteria are employed in the selection of the alternative or alternatives best supported by the data. Possible answers are eliminated as negative data are revealed leaving the question without a conclusion if there is insufficient information to support the proposed alternatives. The relative importance of the factors considered and limitations of the general applicability of the conclusion must be considered in a statement of an answer to the question posed.

In assessing the conclusion, each section of it, as revealed in the organizer, is compared to the original question or focus in order to determine the extent to which the conclusion meets the intended goal.

The conclusion can be expressed in any one of a myriad of ways. Decisions at this point take into consideration the complexity of the message, the intended impact on a specific audience and the state of that audience's understanding of the topic in order to

present the communication in the most appropriate way to meet the purpose.



At this stage the problem-solver critically evaluates the research procedure, the limitations of the conclusion and the degree to which the chosen format of expression clearly conveys the conclusion to a particular audience. The suitability of the mode of expression is evaluated in light of purpose, nature of the information, nature of the audience and the time allotted for the communication.

PROBLEM SOLVING AND WRITING

Lee Odell (1973) argues that we come to know the world through problem solving and we come to know some part of that world that we wish to communicate to others in written form in the same manner; therefore, writing is a problem solving process. Odell contends that significant improvement in writing comes only as students grow intellectually. It then becomes the responsibility of the teacher to make his students aware of the cognitive processes inherent in writing. He must provide writing experiences that allow students to practise those cognitive skills that ensure their continued growth.

Odell supports his ideas by briefly reviewing Piaget's work on human intellectual development. Cognitive growth results from

interaction with the world in an effort to resolve some sense of "disequilibrium", a state in which our view of the world will not account for some change that has taken place either in or outside of ourselves. In an attempt to resolve this dissonance we "assimilate" the world around us, select and shape experiences to fit our existing "structures" or conceptualizations of the world that are already stored in memory.

Piaget suggests that the thinking that goes on in this problem solving process is conscious and learned. Odell believes that the teaching of thinking strategies is a responsibility of educators and a prerequisite of writing instruction.

Table 2 is a comparison matrix which has been designed to discover similarities of behaviour between problem solvers and writers. Should a significant number of similar behaviours be discovered it can be assumed that the cognitive skills that underlie each stage in problem solving are also those that allow for skillful written communication. Because of the knowledge that is available concerning the cognitive processes embedded in problem solving teachers would have direction for productive and efficient intervention at critical stages in the writing process.

The three analyses of the writing process presented for comparison with the problem solving model have been chosen because they represent a theoretical perspective of writing (Young, Becker and Pike, 1970) and an understanding of it gained by direct observation of students of different ages and stages of development as they engage in the composing process. (Emig, 1971; Graves, 1975a; 1975b).

TABLE 2

A COMPARISON MATRIX SHOWING THE RELATIONSHIP BETWEEN STAGES OF PROBLEM SOLVING AND OBSERVED STAGES OF THE COMPOSING PROCESS.

PROBLEM SOLVING STAGES Lois Banks, et al. (1978) / COMPOSING PROCESS STAGES	YOUNG, BECKER AND PIKE (1970)	JANET EMIG (1971)	DONALD H. GRAVES (1975a; 1975b)
INITIAL EXPERIENCE All dominant and minor characteristics of objects or events are identified. Differentiations are made between the known and unknown and the familiar and unfamiliar. Discrepancies and contradictions in information are recognized. Concepts are formed by grouping similar facts.	**PREPARATION** The experience is explored from all angles. Physical features are identified. Contrastive features are identified. The range of physical features is noted. Differences are discovered. The experience is segmented along a continuum. into nameable recurring "sames". Parts of the experience are identified. The experience is located in a large system. The experience is located in a temporal sequence. Inconsistencies are noted.	**CONTEXT OF COMPOSING** Community, family and school influence writing. **NATURE OF STIMULUS** Registers: "Field of Discourse" is concerned with encounters with the natural, induced environments or artifacts, human relationships or self. "Mode of Discourse" is determined by considering, What does this experience mean? How, because of the experience, do I interact with my environment? "Tenor of Discourse" is expressed by the degree of formality observed in the writing itself. The stimulus can be self or other-initiated. **PRE WRITING** Writer begins to perceive selectively certain features of his inner and/or outer environment usually at the instigation of the stimulus.	**PRE WRITING** Stimulating classroom environment provides experiences for writing. Discussions with friends provide ideas for writing. Themes for writing are chosen. Resources in the classroom assist writing.
QUESTION Inquiry question is formulated which clarifies and focuses on the essential issue. An inquiry question guides an investigation of several answers, demands facts to support or reject the possible answers and is manageable in terms of time and resources.	**PURPOSE** Inconsistencies are stated as a problem. What differences about an experience do I want to share to improve communication and understanding?	The writer is motivated to write by self-encountered or other-initiated stimuli. Purpose for writing is most often teacher-directed in school. Writing assignments are influenced by: i) student's relation to teacher, peers and English curriculum ii) audience iii) deadlines iv) length v) treatment of written outcomes vi) student ability and comprehension of task vii) motivation	Writing is teacher-directed and self-directed.
ALTERNATIVES/DATA COLLECTION A number of possible alternate answers are suggested. Additional alternatives may arise during data collection. Directions for data collection are determined by the nature of the question. A wide range of skills is used to search for and collect data. Tentative conclusions are made on basis of perceived relationships before all data is collected.	Statements of reasonable hypotheses or answers to the question are made. Concepts in the problem are isolated. Context of the distribution of phenomenon are identified. This is a period of incubation in which imagination can supply possible answers. Experience is contrasted with what is already known. Relationships with other units of experience are identified. Verification of answers through data collection to determine the most useful answers to problem occurs.	**PLANNING** The selection and ordering of elements occurs. Oral or written establishment of elements occurs and parameters are set. People and events influence inclusion or exclusion of content. Planning is the projection of a total piece of discourse. Anticipating is the projection of a portion of discourse often concerned with lexicon and syntax.	**PRE WRITING** Children rehearse ideas for inclusion in stories in discussions with family and friends. Reactive Writer The immature writer rehearses content for stories by drawing a picture. The child makes appropriate sound effects as he draws and writes. Reflective Writer The more mature seven-year-old spends little time in pre writing activities. (Hypothesis: This child is in a constant state of rehearsal for writing through daydreaming, story telling, reading or listening to stories.)

TABLE 2 (Cond't)

SYNTHESIS Judgements are made on the basis of collected information as to which alternative or alternatives give(s) the best answer. Conclusions are drawn based on the judgements. The relative importance of each alternative is indicated in the conclusion.	Ordering principles are formulated. Illumination, the imaginative leap to possible solutions, occurs.		
ASSESSING THE CONCLUSION The original question is compared with each section of the conclusion to determine the extent to which the question has been answered.	The conclusion is examined in light of the original question. The ideas gathered are assessed in light of the purpose.		
EXPRESSING THE CONCLUSION The form of the communication of the conclusion is decided upon after considering: i) the nature of the data ii) the audience iii) the purpose of the communication	Decisions about strategy of presentation are made. The audience is considered and the generalization is conveyed in relation to information the reader possesses. Pattern of discourse is considered. Linguistic choices are made. Writing occurs. The writer's style becomes apparent and is a matter of the choices he makes about solving problems inherent in writing.	**STARTING** The writer begins to put words on paper. The writer considers lexical, rhetorical and imagaic components. The writer's style is revealed by the characteristic ways of deploying the transformational apparatus of the language. Many hesitation behaviours occur which include: i) critical comments ii) expressions of feelings and attitudes toward self as a writer and the reader. iii) digressions iv) repeating elements v) reading vi) silence vii) non-external thinking and composing. **STOPPING** Writer stops frequently during composing to evaluate work. Final stop occurs when writer has a sense of closure. **REFORMULATION** Large units of discourse are recalled from memory against the "noise" of all intervening experiences. The writer takes the part of the reader needing all grammatical and rhetorical aids. Levels of reformulation include: i) correcting (trivial) ii) revising (reformulation of larger segments of discourse). iii) rewriting (involves total reformulation of piece).	**COMPOSING** Actual writing of the message takes place. Considerable concern is shown for spelling. Proofreading and rereading behaviours are observed. Resources are consulted. Interactions with peers and teacher occur. Erasing of written work occurs.
EVALUATION Procedure is evaluated by considering difficulties in: i) posing research question ii) obtaining information iii) choosing among alternatives Improvements noted are to be used subsequently. Conclusion is evaluated by considering: i) the limitations of the conclusion ii) difference between observation and inference; conclusion and hypothesis iii) application of conclusion to similar situations. The expression is evaluated by considering: i) the degree to which the final expression clearly conveys the conclusion ii) the suitability of the format for purpose and audience.	**EDITING** Evaluation concerns: i) pattern of discourse ii) paragraph structure iii) language choice iv) rhetorical choices v) plot vi) focus (purpose) vii) reader needs Editing begins with a sense that something is wrong with the way ideas have been expressed.	**CONTEMPLATION OF PRODUCT** The writer looks at part or all of the creation and finds it good, uneven or poor.	**POST WRITING** The product disposition is considered. Child solicits approval from others. Proofreading takes place. Evaluation Criteria for: a) Reactive Writer i) shapes letters well ii) draws well iii) is neat iv) spells correctly v) good work has a good picture b) Reflective Writer i) pre-thinks ii) writes a good beginning and ending iii) attends to punctuation iv) writes whole sentences v) includes how people feel vi) good work is long, includes funny people and is about an unusual subject.

The match between the behaviours perceived by Young, et al. as being essential to composing and those in problem solving is obvious. This is not surprising since the authors view writing as an act of discovery and the traditional steps of preparation, incubation, illumination and verification of the inquiry process are embedded in their description of writing. As well, the significant number of similarities that the matrix reveals overall suggests that the empty cells in Emig's and Graves' observations appear for some other reason than the fact that writing is not a special instance of problem solving.

The observations of Emig and Graves were based largely on protocol analysis, a procedure which has certain limitations. The researchers analysed the verbal output of writers in an attempt to deduce the internal operations being called into play during the process. If the subject is not aware of all that he is doing, there is a chance that he will not verbalize certain operations. (Lindsay and Norman, 1972)

Both Emig and Graves indicate that their subjects did not consciously break their writing performance into stages but attacked it as one task. Bereiter (1978) notes the large number of skills called into play while writing and in citing Pascual-Leon's theory of constructive operators points out that there is a limited number of mental schemes that a mature adult can keep simultaneously activated. The immature writer, he contends, in order to write at all, attends simultaneously to only those operations which permit him to get the job done.

It is possible that the operations may not have been learned and would not be stored in the beginning writer's memory struct-

ure. It is for all these reasons that gaps in the comparison between writing and problem solving could result from a practical analysis.

INITIAL EXPERIENCES STAGE COMPARISON

All of the authors represented in the matrix identify what occurs before anyone is moved to either question relationships that exist in the world or communicate them in written form. Experiences and interaction with the environment are critical.

Young, et al. (1970) notes several operations that precede writing. One must segment the continuum of any experience into nameable units or discrete bits. These "chunks" of experience are understood only if they are contrasted with other units of experience by identifying how much the experience can change and still be recognizable as the same thing. The experience must be located in a larger class, in a time sequence, in a physical context and in a system of things before it is fully comprehended.

Emig (1971) reports that at this early stage the writer begins to perceive selectively certain features of his inner and/or outer environment. She notes, as well, that the mode of written discourse can guide selection for content by directing the search for specific components which it contains. Emig indicates that secondary schools provide little or no opportunity for discovery experiences necessary at this stage.

Graves (1975b) reports that the stimulating classroom environment, in which he observed one child writing easily and well for a seven-year-old, played an important role in developing her writing skill. The freedom to interact with interesting materials

discuss with friends and choose topics for writing were all important aspects of the process.

It is the creation of such an environment for discovery that is the aim of the "open classroom". Betsy Siegel (1975) describes the atmosphere of freedom from teacher imposed topics, easy access to a wealth of materials through which to communicate and an environment in which the communication is valued rather than judged. All too often, however, teachers see that quality writing does not automatically result as a function of an open environment. Children need to be consciously aware of what senses are involved and how to use them productively to learn about their world. Teachers must intervene at this point by providing activities that cause the child to become aware of and use observation skills to perceive less obvious characteristics of objects and events.

Information gathered through the use of observation skills is the raw material which is manipulated using all the other basic cognitive operations. In this way discrepancies and inconsistencies are uncovered which prompt the asking of questions. The finding of solutions to such queries is learning and the material of which meaningful communications are made.

An example of an intervention activity to make use of visual perception to improve student writing is provided by Lee Odell (1975). Students can find more significant content for their compositions by adding information acquired through a "shift in focus". By arranging pieces of cardboard on a picture so as to block out portions of it the student is led to focus on detail

that he may otherwise miss.

Activities designed to stimulate awareness of and growth in the basic cognitive skills may not lead directly to better writing but it is unlikely that any good writing would occur without these prior experiences.

The maturity of the writer does not preclude the necessity of these kinds of activities. Rohman and Wiecke (1964) regard the pre-writing stage as the very heart of good composing. It is the point at which discriminably different things are rendered equivalent and objects, events and people are grouped into classes. It is a process of categorization or conceptualization by direct involvement. Currently, they suggest, most student relationships with their own writing and writing classes is "phony" because most of the concepts they hold are inherited from the culture rather than formed through experience for themselves. Effective concept formation, to these investigators, includes three things:

1) attention to the particularity of events; and
2) attention to the personal sense of what is real; and
3) transference of an already known structure of events to the events of the subject.

In a one semester, sophomore writing course Rohman and Wiecke instructed students in the use of strategies that were consistent with the above principles of concept formation. The students kept a journal, meditated and used analogy as pre-writing activities. There was a statistically significant improvement in the quality of ideas and relationships expressed in the essays produced by the experimental group as compared to those from the control group.

QUESTION STAGE COMPARISON

The common feature of all the observations in the matrix at this stage is that there are elements that direct or guide the writing.

Young, et al. (1970) see these elements or purpose for writing in a much more disciplined sense coming largely from within the writer as a result of his experiences with the world. Inconsistencies, stated in the form of a focused problem, give direction not only to inquiry, but to the writing act as well. This allows the writer to make decisions about relevant information to be included in his communication. The components of the mode of written discourse also assist the writer in determining his purpose.

Emig (1971) records that the grade twelve students' purpose for writing appeared to be influenced by the nature of the assignment, deadlines, length, comprehension of the task, the student's relationship to the teacher and the subject, as well as the kind of evaluation of the work. Emig does not indicate that the major motivation for writing comes from a desire to communicate some discovery made by the student.

Graves (1975a; 1975b) does not discuss purpose in writing specifically. He does observe that if children are moved to write by the importance of what they have to say concerning a topic of interest to them, the quality of the ideas expressed tends to improve, particularly for boys.

Charles Stollard (1974) analyzed the writing behaviour of good senior high school students. He observed them as they wrote and interviewed them after writing. Stollard found that an over-

whelming majority of the group (93%) indicated that they thought about having a clear purpose for writing in the pre-writing stage. It appeared that the purpose came from the directions given by the teacher to write a brief essay defending their opinion regarding a recent issue in the news. There was no indication that students formulated any precise statement that would guide their information search or composing. In fact, only 40% of the students indicated they developed any mental plan before writing and 60% said they really didn't know how the paper would conclude until it was nearly finished.

There are those who feel that most writers, even professional ones, do not know what they will write before they begin. Donald Murray (1978) believes that this is not a weakness but merely indicates what a learning process the act of writing is. He maintains that writing is a process whereby language is used by people,"as a tool of exploration to see beyond what they know". It is suggested that writing without a clear purpose is inefficient and in no way preempts the learning potential inherent in the process; but a lack of direction may in fact inhibit it.

Bereiter and Scardamalia (1979) indicate that genre of written discourse can direct student writing. Grade four and six pupils, after assistance in recalling the components required by narrative and opinion writing, included more of these elements in their compositions. According to Bereiter and Scardamalia, the weakness in relying on genre for purpose in writing is that it tends to promote a developmentally unsophisticated level of performance.

The next stage in problem solving is Generating Alternatives and

Data Collection which correlates with the Planning or Pre-writing stages of writing observed by the investigators in the matrix. It is at this planning stage in the composing process that comparing writing to problem solving holds considerable promise in allowing teachers yet another opportunity to assist students in an organized and systematic way. Appropriate intervention at this point appears to significantly affect the quality of student writing and help students gain control of a process which so often appears mysterious and threatening. Hopefully, children will be able to stop commenting, "I don't know what to say". Because of the relationship between this stage and the research study presented in detail in this paper, an analysis of it will be left as a final consideration before the study.

SYNTHESIS STAGE COMPARISON

Young, et al. (1970) identify a point at which the writer arrives at generalizations about the relationships that exist among the elements of the world that have captured his interest. It is a time when imaginative leaps to possible answers are taken; it is a time when the writer feels motivated to communicate his knowledge to his audience.

The observations of Emig (1970) and Graves (1975a; 1975b), summarized in the matrix, do not describe a synthesis stage in writing but Emig characterizes the "Starting" stage in an intriguing way. She says it is the most difficult point at which to identify specific behaviours and a possible explanation for the choice of a particular moment for starting could be found in Freudian theory. Starting, in this light, could be regarded as the point when the unconscious mind breaks free from the control

of the ego and super-ego.

Whatever the ultimate explanation for this stage in the composing act, an assumption of this paper is that, the dynamic and recursive nature of problem solving notwithstanding, composing is generally sequential. There are stages in the act at which it is most productive to attend to certain processes rather than others. Each stage is so intimately tied to what has gone before that the sense of "closure" that prompts written communication depends a great deal on the information gathered in the Initial Experience stage and how it is organized in the Data Collection stage. The fact that the students, whom both Emig and Graves observed, engaged in little or no deliberate data collection would provide no opportunity for the observation of a synthesis or conclusion process.

ASSESSING THE CONCLUSION STAGE COMPARISON

Young, et al. (1970) identify a Verification stage in writing which matches the behaviours occurring in problem solving while the adequacy of the conclusion is being assessed. At this point the writer asks himself whether his choice of ideas and their organization meet his original purpose, reflecting himself, his ideas and his intended audience.

Emig (1971) does not identify a stage in writing in which students attend to assessing the appropriateness of some main point they wish to communicate as a result of investigating a topic. Again, this is unlikely to be observed as obvious deliberate behaviour if the students have not engaged, in any organized way, in the prior steps. Emig (1971) laments the "other-directed" nature of

writing as it is practiced in schools, which militates against students engaging in reconceptualization activities.

It must be emphasized that even in the problem solving process, this stage may or may not appear as an isolated, conscious act. Its appearance often depends on the importance of the question, the complexity of organization of information and on the maturity of the student. Grade three pupils whom this writer has observed while engaged in problem solving, often arrive at a tentative answer to their questions based on the patterns revealed during data collection and tend to assess this conclusion as each new bit of information is added. Unless the observer is aware of what mental activity is required at this point, this stage might pass unnoticed.

Graves (1975a; 1975b) notes proof-reading, rereading and erasing behaviours during composing but there was no indication that these changes occurred because the seven-year-olds were assessing how they would fulfill a preplanned purpose.

EXPRESSING THE CONCLUSION STAGE COMPARISON

Young, et al. (1970) see the behaviours an author displays in isolating and identifying problems concerned with ways of communicating a message and the deliberate choices he makes to solve those problems, as aspects of his style. In this way writing is seen as problem solving within problem solving.

This complexity of the composing act is nowhere more evident than at the communication stage. The element that is common to the cells in the matrix at this point, besides the transcription of the message, is revision. Particularly in Emig's observations

there is revision dealing with content, syntax, lexis and rhetorical choices all going on at the same time. She further states that this revision is engaged in more readily by secondary school students when the writing they are doing is self-sponsored, as opposed to school-sponsored.

The younger students whom Graves (1975a; 1975b) observed tended to revise at the word level.

Attention to multiple processes often inhibits student concern for content. There is a limit to the number of elements to which an individual can attend at any one time. In order to accomplish the task at hand, students will attend only to those aspects of writing that they perceive as important. (Bereiter, 1978). In the current instructional climate students see the surface features of writing as most demanding of their attention.

In an attempt to extinguish this behaviour so that ideas can become the focus while composing, Peter Elbow (1973) teaches students a procedure whereby they compose deliberately without engaging in any revision. It is easy to see why such an approach can result in improved student writing performance. The success with this method exemplifies the need students have for procedures which permit them to deal consciously and selectively with the operations required at any stage in writing, in some manageable way.

EVALUATION STAGE COMPARISON

Young, et al. (1970) view a writer's evaluation of his work at a sophisticated level and provide an end point for this stage toward which to strive in teaching beginning writers. The key issue is

that the author begins to edit his first draft when he senses there is something wrong with the way he has expressed his ideas.

As is obvious from the matrix, Emig (1971) observes that evaluation of their writing by secondary students meshes with the Communication stage. Emig suggests this is largely because the students see writing as a task to be completed within a Language Arts period. There is little time for dawdling or contemplation. Most often the writers are concerned with correcting errors rather than considering the content and the structure of its presentation. Revision is regarded by the students too often as punishment. The evaluations they receive from teachers tend not to be concerned with what they have to say and students feel teachers are often not interested in rereading their revisions anyway.

The students Graves (1975a; 1975b) observed, generally evaluated their writing at a superficial level. The more immature seven-year-olds believed good writing shows well-spaced letters, neatness and correct spelling. The more mature were beginning to become aware of the value of pre-thinking, including people's feelings in their writing, and choosing unusual subjects.

Increasingly evaluation of student writing by teachers is becoming concerned with identifying the level of development the student has reached in a hierarchy of learning for some concept or skill. (Dixon, 1967; MacDonald, 1975; Cooper, 1975) The information thus gathered is used to make instructional decisions in order to ensure the growth of individual students. Hopefully, the modelling of this form of evaluation by teachers will provide students with more productive evaluative criteria by which to

revise their work.

As commendable as this approach is, a major problem remains. All the knowledges, cognitive skills and affect in operation at each stage of the writing process have yet to be completely identified. As well, work has just begun on instructing teachers how to break a complex skill, concept or affect down into its component parts in order to arrange the learnings inherent in them in a hierarchical manner. (Robinson, et al., 1977).

ALTERNATIVES AND DATA COLLECTION STAGE COMPARISON

In practice these two stages are separate but because of their interrelatedness it serves the purpose of this paper to deal with them at the same time.

Upon examination of the matrix there appear to be two distinct operations occurring, the gathering of content, and its organization. In the interest of clarity each operation will be dealt with separately.

Content

Young, et al. (1970) describes this stage as one in which reasonable answers to the problem are hypothesized. A period of verification follows during which details of content relative to each proposed answer is evaluated to determine the most reasonable and useful solution. The authors also characterize this phase as a period of incubation, a time of subconscious activity which is often better able to deal with complex situations than conscious, analytical procedures. It is from this period, the authors state, that great flashes of inspiration occur in response to problems. Inspiration, as yet an unaccountable happening, may in fact be

found to play a part in writing and problem solving, but more and more researchers believe that it comes to those who are well prepared. It probably results from a slow process of information search rather than through any mysterious, spontaneous awareness of insights. (Hayes, 1978)

Emig (1971) observed the selection of elements or components going on both before and during actual writing. She indicates that very little time appears to be spent on this before students start to write.

Graves (1975a; 1975b) observed immature seven-year-olds using picture making as a method of searching for content for their stories. As well, Graves (1975b) reports that they found ideas for inclusion through discussions with family and friends. The more mature writers in this age group, he hypothesized, displayed no overt content search-related behaviours because through daydreaming, story telling and the reading of stories, they are in a constant state of rehearsing content inclusion which allows them to launch directly into the scribal act without appearing to go through any search stage.

Obviously the same concern about collecting appropriate information confronts the problem solver and the writer; however, the greatest problem children have with writing is thinking of things to say. (Bereiter and Sacrdamalia, 1979, Elbow, 1973, Kohl, 1967). Margaret Sawkins (1975) employed an interview procedure to ask average grade five students what they thought about before and during writing, and what problems were encountered. She too noted content search going on before and during writing. Some

children at this level still drew pictures in order to visualize what they would say. Of the sixty girls and boys interviewed all indicated that their thoughts were primarily concerned with the content of their stories. The content-related problems were such things as development of the main idea and using good ideas that are interesting and exciting. Students often complained that they would forget what they were going to write because they thought faster than they wrote. Bereiter and Scardamalia (1979) also noted this factor as inhibiting content inclusion in compositions.

In conversation with grade four and six children, Bereiter and Scardamalia (1979) found that children had a great deal more knowledge in memory about a topic than found its way into their compositions. Believing that children are applying conversational skills to the writing situation, which lacks the cueing provided by a respondent to continue generating ideas, the investigators provided the children with "sentence opener" prompts which were suggestive but did not cue specific content. The children were able to produce relevant knowledge which met the demands of the written prompts as long as the researchers were directing the content search. The children were not, however, as successful when left on their own with the prompts, which led the investigators to conclude that children need help in self-cueing to search for knowledge when engaged in the solitary activity of writing.

Bereiter and Scardamalia (1979) identify two kinds of memory operations going on during this stage of the writing process, both of which present difficulties for children. Meta-memorial

search is a prerequisite to, but does not insure that, the more sophisticated goal-directed memory search will occur. The first is a search for the major contexts related to any topic and the detail corresponding to each one. Goal-directed search involves selecting, from the knowledge generated by meta-memorial search only those elements that help the writer achieve some purpose.

The importance of organized content search at this stage to the whole writing enterprise cannot be overstated. It is at this planning stage that informed teacher intervention can have the greatest impact on children in developing writing skill.

Organization

All the authors in the comparison either believe there is a need for or observe an attempt at organization of content. Unfortunately time is rarely allotted to these activities nor are students motivated to engage in them for any length of time. The planning that is usually done tends not to make a qualitative difference in student written performance. Young, et al. (1970) state that at this point, writers need to identify the contexts in which the phenomenon under observation occurs as well as to discover the relationships to other units of experience.

In the Rohman and Wiecke study (1964), cited earlier, the researchers regarded the organization stage as the third critical step in their research into pre-writing activities to motivate composing. A major problem a writer faces, they hypothesized, was "concept transference". They meant by this the discovery by the writer of patterns of experience within himself with which to organize his subject. The act of transference is carried out

when the various concepts of a person's stored experience are converted into categories for the apprehension and articulation of a new experience. The researchers developed a technique using analogy to make the process of assimilation more obvious and deliberate for their students. This abstract procedure significantly improved the written performance of the mature students in their classes.

Emig (1971) identifies the oral or written ordering of components and the establishment of parameters occurring at this stage. She breaks the organizing behaviour down into two kinds. She refers to "planning", the projection of a total piece of discourse, and to "anticipation", the projection of a portion of discourse, which can take place several times during the writing of a composition.

Emig reports on a survey conducted before her study of the composing behaviours of twelfth graders was carried out. She asked sixteen professional and academic writers to document the planning practices they engaged in before beginning to write. All of the writers stated that they did do some form of planning. Only four of the writers said that they followed the traditional outlining techniques advocated in composition textbooks. Planning strategies took varied forms for the rest of the group, forms such as conversations with friends, the jotting down of meaningful phrases which were later classified into categories or a simple sequencing of headings. These writers also supported Emig's observations that planning occurs frequently during the writing process.

The planning period of the students she observed, Emig reports,

was quite brief and occurred immediately before writing. They voluntarily do little or no written planning for school-sponsored writing of less than five hundred words. Emig does not suggest that the students do not follow a plan, because when they are questioned before writing, almost all of the components that they include in their compositions are reported.

Graves (1975a; 1975b) does not label the drawing of a picture as a form of organizing content but in fact that is exactly what it represents. (see Organizer Chart) The whole picture represents simple classification organization of people, objects and events related to a topic. Graves (1975b) did note that the drawing took place in several action-reaction sequences. This certainly represents organizing content for a purpose which is to tell a story. Stories are, in the simplest of terms, sequenced events. (This is a significant observation, one which will be pursued further.) The more mature seven-year-old students that Graves suggested needed no concrete prompts immediately prior to writing may have been doing the seriating of story events in their heads.

This supposition is supported by the observations of the composing habits of an average twelfth grade student by Terry Mischel (1974). The subject said he composed thoughts in his head. When composing out loud he would talk about what he was going to write until he had too much in his head; then he would put his ideas down on paper. The only time he engaged in any written form of planning of content was when he was asked to write something longer than one or two pages. In that case he would find out about the subject, take notes and then put ideas into paragraphs.

Obviously the taking of notes is a meta-memorial search taking place, using outside resources rather than searching memory. Both the oral and written planning of the student observed by Mischel is of a low level and results in what Bereiter (1978) calls Associative writing. It is the simplest system capable of producing intelligible writing. It combines only the two skill systems of fluency in written language and ideational fluency. It is essentially writing down whatever comes to mind in the order in which it presents itself. Most of the current writing instruction in school is an attempt to make students' associative writing comply with the accepted conventions of style and mechanics. This is not a particularly high-level aim.

SUMMARY

The new goals for writing instruction may be achieved by regarding the composing process as an instance of problem solving. A comparison of writing and problem solving reveals similar cognitive skills being employed at similar stages in both processes. As well, the comparison suggests two major weaknesses in current instructional approaches to the pre-writing stages. Little school time is provided for students to engage in rich discovery experiences in which the basic cognitive operations are consciously practised. Students need assistance in conducting a goal-directed search for content. As well, they require instruction in strategies that will allow the systematic organization of that content for a specific purpose.

CHAPTER THREE

PREFACE TO THE STUDY

INTRODUCTION

A writing process model proposed by Carl Bereiter will be presented in this chapter. Relationships between his model and problem solving will be proposed. As well, it will be demonstrated that the information organizers used in problem solving can be adapted to the composing process. Further, it will be shown that the use of information organizers do produce qualitative improvement in the content and organization of student compositions.

The Bereiter Writing Process Model

Bereiter (1978) presents what he refers to as a roughly sketched cognitive processing model of writing which he and his colleagues have spent the past several years substantiating with empirical research. It would seem to be the only model thus far that is supported by investigations that reveal the cognitive operations underlying the sophisticated intellectual performance which we call writing.

Bereiter's model contains the following elements.

1) A high-level executive scheme directs the whole writing operation in keeping with certain purposes and constraints.
2) A set of genre schemes contains the writer's knowledge of how to carry out various types of writing. A genre scheme contains a limited set of fairly specific intentions and a set of strategies or "game plans" which contain:
   i) categories of content

ii) search procedures for content

e.g.: -consulting records or informants

-memory search

iii) tuning instructions for language output. e.g.: -formal

-informal

3) A content processor draws semantic material from memory and organizes it according to instructions from the genre scheme.
Its output is a "gist", a unit of content not yet formed into overt language.

4) A language processor puts units of content into explicit language according to tuning instructions from the genre scheme.

In light of the obvious relationships between writing and complex intellectual performance it is suggested that the Basic Inquiry Model provides a visual representation of an executive scheme which directs the writing process for some purpose. It allows, in an obvious and systematic way, for the successive selection and conscious application of sub-processes inherent in writing, moving from the identification of a problem (purpose) to the resolution of it.

Bereiter and Scardamalia (1979) note some limitations on relying on genre scheme alone to guide writing. As has been discussed earlier, these researchers identified two kinds of search operations going on in writing. It is the more sophisticated goal-directed search that promotes whole-text planning, which Bereiter and Scardamalia (1979) identify as a critical attribute of good

composing. The whole-text organizational approach to writing requires planning, at all levels of detail or generality, to be done with the purpose for communication in mind.

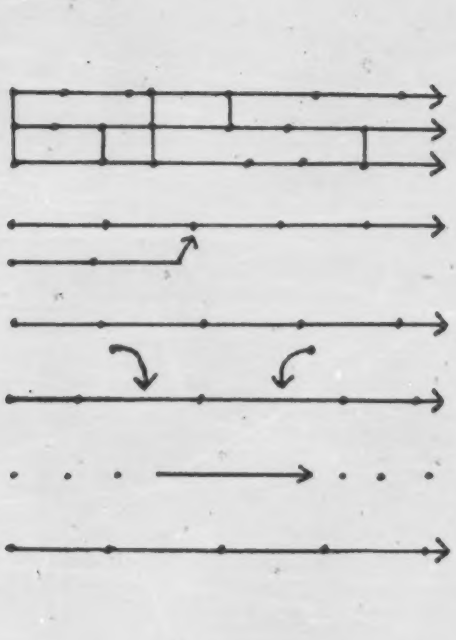
Bereiter and Scardamalia (1979) conducted a study to determine if genre schema provided a framework that promoted whole-text planning. Children, after discussion with the researchers, identified the components of three different genre: narrative, opinion essay and direction writing. The students were then instructed in a procedure whereby they used these components in planning compositions. Their writing displayed the inclusion of a greater number of the components than the compositions from the control group, but they tended not to differ significantly in content or language. The investigators concluded that the direction provided by genre schemes promoted local planning. Local planning produces the low-level Associative writing that Bereiter (1978) notes is characteristic of most student compositions written in school.

This problem is overcome by coupling directions provided by a genre scheme with the precisely stated purpose in the executive scheme. In fact, the writer's purpose may suggest a particular mode of written discourse. For example, if the writer experiences a beautiful sunset, which he wishes to share in written form, he may well choose the descriptive prose genre as the most effective way of conveying his message to his audience. When the purpose and genre are combined they guide a goal-directed search for content and can provide a systematic way of organizing information.

GENRE RELATED ORGANIZERS

The telling of a story, as stated earlier, is basically the ordering of events which can be represented on a sequence line.

A graphic display and growth scheme for the basic cognitive skill of seriation is presented in Figure 4. (Popp, 1979) This growth scheme meets the demands of the narrative genre.



8. Intro. style through varying starting points
7. Multiple, interrelated sequences of events
6. Parallel sequences -little or no interrelationship
5. Simple Narrative
4. Interpolate
3. Extrapolate
2. Locate on line
1. Sequence events

Figure 4: Seriation Growth Scheme showing the sequence line as it is used in simple and complex instances of narrative or direction writing.

The growth scheme represents development in seriation from simply ordering events according to some difference, to placing them in order on a continuum, to identifying events that come before or after those on the sequence line. The next level of difficulty represents identifying events on the sequence line between which other events can be placed. Step five in the growth strand presents the simple, time sequence line as an organizer for the narrative genre. It also serves well as an organizer for giving directions. The most sophisticated use is the multiple sequence line organizer for a complex plot which shows the possible interrelationships of events.

Whenever events related to an issue of interest are classified along two dimensions, an appropriate organizer is the cross-classification chart. A common example of the use of such an organizer occurs in the decision making context. This situation calls for relevant criteria (one dimension) to be mapped across appropriate alternatives (second dimension). However, the same cross-classification organizer is useful in any context where two dimensions of one idea are considered simultaneously.

A growth scheme for Classification shows where the cross-classification chart organizer, for opinion theme writing which involves two dimensional comparisons, fits into the hierarchy of the development of the skill of classifying. It is presented in Figure 5. (Popp, 1979). The scheme represents in a very general way the learnings a student must acquire in this skill before being able to organize information in a cross-classification chart. A simple explanation of Classification will aid the interpretation of the strand as it relates to writing.

A child must first be able to determine which objects among a large group of objects belong in a defined class. He must then be able to allocate all the objects from the large group to classes along a dimension. He must completely classify a collection of objects on the basis of one criterion and then, reclassify it on the basis of another. He must display proficiency in selecting an element that fits in the intersection of overlapping classes. At this point the child can deal with several intersecting classes at once as represented by the cross-classification chart.

The tree-diagram, the most sophisticated level of classification,

4. Design tree-diagram (identify classes)
   -identify and classify elements
   -introduce style by altering
   direction and starting point

3. Construct tree-diagram to classify
   elements of interest
   -fill in cells
   -write following diagram

2. Cross Classification
   (objects (or events) by Factors)
   -put information in cells
   -write comparisons
   -introduce style through
   direction taken

1. Generate many characteristics
   of object or event
   -classify and discuss
   separate classes

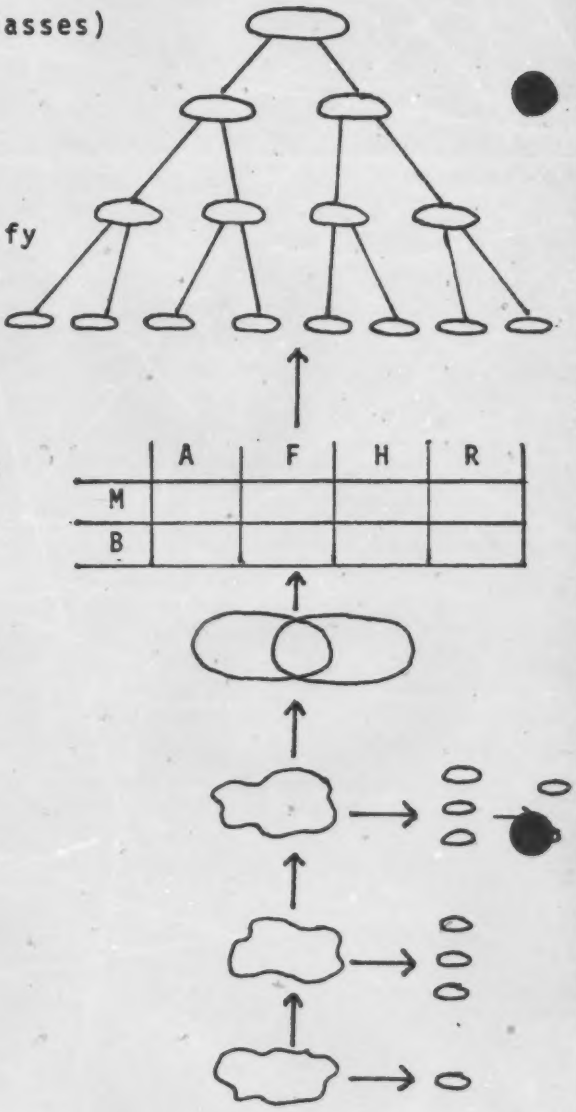


Figure 5: The Classification Growth Scheme showing the skill of grouping objects or events according to similarities including the cross-classification chart organizer for opinion theme writing and the tree-diagram organizer for literary descriptive writing.

holds the potential for multi-dimensional investigation of a phenomenon required by any literary descriptive writing. This kind of description, quite different from the scientific descriptive writing of research reports to which the cross-classification chart most often lends itself, requires an organizer which permits a more global search for components and detail.

The organizers related to each genre provide framework for the content processor in Bereiter's writing process model. Not only does the organizer promote the collection of information from memory and other sources, but it does so in the context of the critical components of a particular genre scheme. When information is selectively chosen for inclusion in the organizer under the direction of the writer's purpose, the potential for quality writing is apparent.

As well, the organizer provides for the identification and storing of appropriate and rich language which will later be used to communicate the message.

In summation, the use of organizers stabilizes for the writer the process in which he is engaged. It provides a visual representation of his thinking, the search for patterns that exist in experience. It holds the potential for the creative manipulation of ideas without losing sight of purpose. It allows the writer to consciously attend to sub-processes called into play while composing without interfering with the prime function of writing, the communication of the new meaning he has discovered in his world. The strategy is in no way rigid or mechanical. The complexity of the organizer is limited only by the writer's knowledge, ability and experience. It promotes the awareness of the recursive,

dynamic nature of the composing process.

THE COMBINED EFFECT OF GOAL AND ORGANIZER

A detailed examination of a writing task used by this author with grade seven students will serve to clarify the relationship between writing and the use of organizers.

A picture of a distressed kitten which had scampered up a tree only to find that fear held it captive among the branches was presented to the students.

The genre dealt with in the task was literary description. In this mode the writer is keenly aware of his senses' response to the world around him and he attempts to transmit that picture of the world, as he perceives it, by exciting the reader's senses. As well, he wishes to convey, through the use of precise and colourful language, the emotions that the experience stimulates in him. (McMaster, 1965). After several prior descriptive paragraph writing experiences, the students were familiar with the above intentions and could identify the components of this mode of written discourse. The components were: 1) main impression (emotional component)

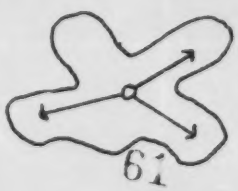
2) major categories and sub-categories of the subject

3) identification of attributes (use of senses)

4) descriptive language.

Viewed from a problem solving, executive scheme perspective, the task appears as follows.

Initial Experience



The picture of the stranded kitten acted as a stimulus for recalling experiences that the students had had with pets in similar situations. During the discussion that followed the introduction of the picture, a list of synonyms was generated that identified the feelings the kitten was experiencing. Generally, the group decided that the emotional component to be conveyed to the reader was a sense of fear and helplessness.

Question (Purpose)

The problem confronting the students, their purpose, was to create in the mind's eye of the reader, by using rich and sensitive language and all critical attributes of major and sub-parts of the picture, the same sense of fear and helplessness that they, as viewers, perceived in the kitten.

Alternatives

The alternatives that were chosen were the categories, sub-categories and sub-sub-categories. All of these constituted the components that the students identified as those to which they must attend, if they were to meet their purpose of a global description of the picture before them. The components are in the "bubbles" in the tree-diagram organizer appearing in Figure 6.

Data Collection

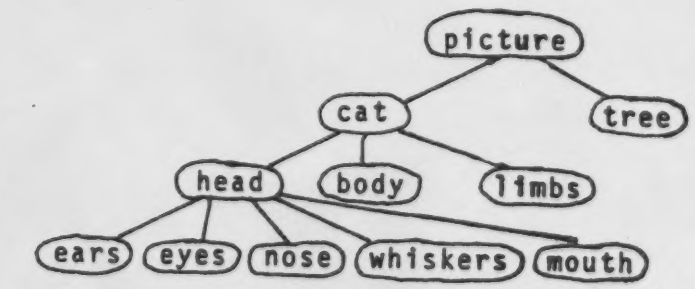


Figure 6: A tree-diagram organizer for the kitten descriptive paragraph showing categories, sub-categories and sub-sub-categories.

It is obvious now why Alternatives and Data Collection were grouped as one stage. The organizer contained both the alternatives and the data collected to match each of them.

One of the sub-sub-categories, ears, has been isolated and presented in Figure 7. It clarifies how the goal-directed search for language, which corresponds to the three classes of attributes identified, was collected.

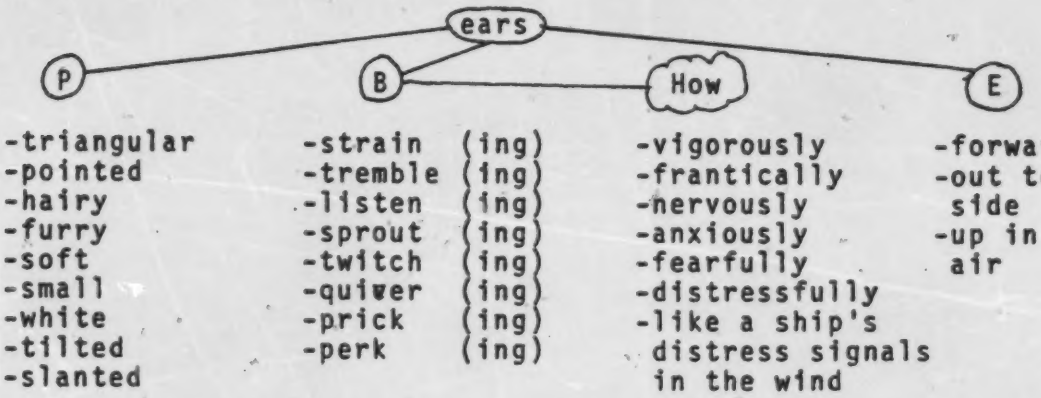


Figure 7: The sub-sub-category "ears" of the kitten tree-diagram organizer showing the language collected to identify physical, behavioural and environmental attributes.

The "P" stands for the physical attributes, the characteristics identified through the appropriate senses. In this case sight was dominant and identification was guided by the question, "What do I see?" Using their imaginations would allow students to pose other questions that would guide inclusion of attributes identified by hearing, touching and tasting.

"B" stands for behavioural attributes which were identified by answering the questions, "What are the kitten's ears doing?" The responses can suggest covert as well as overt action.

"E" represents environmental attributes which were collected by

answering the question, "Where do the kitten's ears do what they are doing?" This class of characteristics can also include elements identified by responding to the question, "In what emotional climate do they do it?"

All of the choices for each attribute class were made with the main impression to be conveyed in mind, causing whole-text planning to occur. This language collection procedure also serves to crystalize and stabilize the range of word alternatives which makes putting ideas into explicit language, the work of the "language processor", more manageable.

Conclusion

A conclusion was reached, or at least some sense of closure was experienced, when the students felt that they had collected a wide enough range of language to allow them to begin to write.

Assessing the Conclusion

Assessing the conclusion, rather than presenting itself as one observable act at the end of the planning stage, went on throughout the whole organizing phase. The students worked in small groups discussing the inclusion or exclusion of words, phrases and similes. It was clear that they assessed their choices in light of their appropriateness to the concept in the "bubble", as well as their precision in conveying the main impression.

Communication

64

At this stage the students wove the concepts in the "bubbles" and the language collected under each appropriate attribute class

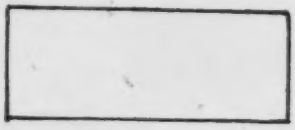
into the intended communication.

A glance at the organizer reveals that the subjects of sentences (even paragraphs) came mainly from the "bubbles", adjectives from the physical attributes, verbs from the behavioural attributes and adjective and adverb phrases from the environmental attributes. The How class of words was added to the organizer because the students needed to be able to identify adverbs. The students were able to use subject and verb descriptors or the more traditional labelling of parts of speech with equal ease. Many students became intrigued by adding "ing" to verbs and using the present participle to build adjective clauses into their sentences. Using a procedure much the same as O'Hare (1971) suggests for sentence combining, students consciously "played" with the language to produce different sentence patterns of varying degrees of complexity. The students achieved this variation in sentence structure by beginning the sentence for each concept with words chosen from a different attribute class. Run on sentences tended not to appear and sentence fragments only rarely, usually when the students were experimenting with present participle construction. Consistent with Cooper's (1975) thinking, it was natural and well received by students to stop their writing for a brief lesson which would assist them to overcome such difficulties as they arose.

Elements of style were introduced at this point. The teacher offered one possible order for the presentation of ideas by suggesting the introduction of the setting, the subject and the main impression at the beginning of the paragraph. The details of each sub-sub-category, which supported the main impression, foll-

owed the introduction. A sentence in which the main impression was restated in some alternate way to that appearing in the beginning, concluded the paragraph. Assistance with the sequence of ideational presentation was necessary because several students indicated that they had difficulty beginning their compositions. Some of the more confident students, however, chose to describe the kitten by not identifying the animal until the end of the paragraph.

It became apparent quite early to the students that the teacher would assist in helping to generate alternatives at the planning and communication stages and provide criteria on the basis of which they could make decisions, but that final choices were up to them. Among the students, there tended not to be a concern for right or wrong choices, rather a concern for more powerful ones.

Evaluation 

Evaluation of sentence structure, word choice and sequence of presentation of ideas went on during the whole communication stage. Much of this was done out loud. Often a grammatically correct sentence would be rejected on the basis of its awkward sound or rhythm.

Donald M. Murray's (1978) discussion on revision centres on what a writer does after a first draft of a piece of work. Murray identifies two distinct kinds of revision, internal and external. Internal revision is everything a writer does to understand and develop what he has to say. It is at the heart, Murray suggests, of the discovery a writer undergoes while composing. External

revision is what a writer does to communicate what he has written to his audience. Writers attend to conventions of mode, language, mechanics and style at this stage of rewriting.

Most of the writer's time, Murray believes, is spent on internal revision which has four aspects of focus: content, form, language and voice. The first concern the writer has is for content, finding new information and retrieving that which is stored in memory. A second area of focus for the writer is form. Murray implies that the way in which bits of information are related to other bits of information is intimately tied to the form of the genre chosen to communicate the author's ideas. Thirdly, the writer revises his language choices by rejecting words, choosing new words, bringing words together and switching their order. Finally during internal revision, the writer deals with voice, the way in which he hears what he has to say, his point of view toward his subject, his authority and his distance from his topic. Revisions made in each of these areas assist the author in understanding and effectively communicating to others the meaning he has discovered in his writing.

The grade seven students with whom the writer of this paper worked, consciously attended to content, genre-related organization of information and language choice, both at the Data Collection and Communication stages of composing, rather than after a first draft. Emig (1971) also observed revision taking place largely at the Communication stage with grade twelve students.

If attending to voice, as Murray describes it, is related to a writer's style, the grade seven students dealt with it at a very elementary level. They mainly made decisions about the sequencing

of the presentation of components of the picture so that each would have the greatest impact on the reader relative to conveying the main impression.

Using the tree-diagram organizer seemed to stabilize content search and organization as well as language options to permit productive and satisfying revision to take place.

It was only after the first draft that the grade seven students turned to external revision of their work which generally took the form of changes in spelling, punctuation, grammar and syntax. Fairly high expectations regarding the surface features of writing were set in the class, but it was made clear that they were of secondary importance compared to content and organization of ideas. Despite the emphasis, it was not difficult to get students to attend to elements of external revision. They seemed to be pleased with their products more than just finishing a teacher assignment would merit and most of the students willingly engaged in proofreading.

Often students would say that they did not believe they could write so well. Compared to the quality of their descriptive paragraphs a few months earlier, their evaluations were accurate. The majority of the students said the organizers helped but they found the whole procedure very hard work. It was hard work. The students were consciously attending to more content than they had earlier, more complex organization of ideas, a wider range of richer language choices, all in order to reach a stated goal.

OTHER PROBLEM SOLVING APPROACHES TO WRITING

Odell, (1973) investigating the effectiveness of instruction in

the pre-writing stages of composing, used a problem solving approach. He taught students in freshman English classes a procedure for writing essays on assigned literary works. The procedure used was to:

1. read and formulate questions
2. identify key terms in the question
3. use heuristic procedures to explore own expectations and information at hand concerning these terms (see the comparison matrix for Initial Experiences under Young, et al.)
4. formulate and defend hypotheses to answer the questions.

On a pre and post test comparison of the essays produced by students in the course, some encouraging results were noted. (Odell, 1974). After instruction in the use of the procedures, the students performed more frequently some of the intellectual operations taught. They also supported their hypotheses with a greater amount of evidence.

Odell was satisfied that instruction in the pre-writing stage was profitable for students, but his expectations for performance, as a result of using the procedures, were only partially fulfilled. He had expected that students would perform a greater variety of intellectual operations and that their essays would be better organized and contain fewer conceptual gaps than they did. A number of factors could account for the results, including prior conditioning on how to write essays, the complexity of the procedure, the short duration of the course and the amount of time needed to teach the heuristics. Another factor is obvious. Despite the fact that students were identifying a purpose to

direct the writing they were not instructed in any systematic way of collecting information and stabilizing it so that relationships or lack of them became apparent. It is not surprising that the essays still contained conceptual gaps.

This evidence appears to support contentions of the importance of the combination of purpose with organizers to assist students in the writing task.

Another procedure for assisting writers in the pre-writing stage is presented by Linda Flower and John Hayes. (1977). The procedure was developed by analyzing the writing processes of good and poor writers through protocol analysis. The striking fact that emerged from this analysis was the very limited number of thinking strategies some writers employ.

These researchers also view writing as problem solving, the first step of which is setting a goal. Their procedure, developed mainly for analytical writing, provides an "issue tree" as a way of organizing ideas. The advantages that this method of data organization offers are significant. It provides a more graphic representation of how ideas are related. It does not assume, as traditional outlining techniques do, that the writer starts with a clear knowledge of his subject complete with the high-level concepts. The gaps in a preliminary issue tree show what has not been said and where more thinking needs to be done.

Finally, the authors note a significant factor that emerged when students were taught to write using a problem solving approach. Writers, provided with strategies for effectively dealing with the sub-skills inherent in the composing process, come to believe

that writing is an important skill that they can master. Bereiter and Scardamalia (1979) also report that the elementary students with whom they worked developed a sense of confidence in their ability to compose, when instructed in the use of a planning procedure.

SUMMARY

The Basic Inquiry Model has been presented as an executive scheme which directs the writing process. It provides purpose for the writer as well as guiding conscious attendance to the subsequent sub-processes of the composing act. Tied to the purpose, the genre-related organizers cue students to engage in whole-text planning, which represents significant growth from current student planning strategies.

CHAPTER 4

PROCEDURES FOR STUDY

SAMPLE OF SUBJECTS

The study was conducted in a senior public school in a large southern Ontario town. In order to test hypotheses 1, 2 and 3, thirty grade seven students from a middle socio-economic level community took part.

On the basis of scores achieved on the November 1979 administration of the C.T.B.S. vocabulary sub-test and I.Q. scores obtained on the Dominion Learning Capacity Test, the 123 pupils enrolled in grade seven were classified as above average, average and below average Language Arts students. They were rated according to the following classification scheme.

CATEGORY	CRITERIA
above average	+76th percentile on C.T.B.S. and Dominion Learning Capacity Test
average	50th to 75th percentile on both C.T.B.S. and Dominion Learning Capacity Test
below average	-49th percentile on both C.T.B.S. and Dominion Learning Capacity Test

The two scores used to select students placed 118 of the total population readily into one of the three categories. The two scores of 5 of the students placed them in different categories. In that case the lower category was chosen for placement.

The students were organized into 3 classes taking Language Arts from the researcher and 1 class receiving instruction from another staff member. From within the two instructional groups 5

students were randomly chosen from each of the above average, average and below average categories. The 15 students chosen from the researcher's classes represent the treatment group and the 15 students chosen from the other staff member's class represents the control group.

ATTITUDE SURVEY SAMPLE

All of the 123 students in the two instructional groups (98 using the tree-diagram and 25 analyzing and emulating the works of good writers) were asked to respond to the attitude survey.

GROUP TREATMENTS

Control Group

The control group was taught to write descriptive paragraphs by emulating good writers. All students in the class were given an example of what was regarded by the teacher as good descriptive writing. In class discussions students examined the following variables:

1) words which create a vivid image
2) words which convey strong feelings
3) main impression(the feeling the author is trying to convey to his reader about the object, person or event being described)
4) figures of speech (similes, metaphors)
5) variety in sentence patterns
6) parts of the object, person, event or scene to be chosen for description.

The students then attempted to incorporate the particular element discussed into their own descriptions of topics chosen from a class-generated list. This procedure was repeated 6 times during

the school year. Students looked at the characteristics and practised the narrative and expository modes of written discourse, as well as description over the course of the year.

Treatment Group

Early in the fall the students were taught a procedure for identifying the attributes of common objects such as:

1) a cracked mug
2) a child's toy
3) a tomato
4) a string of beads
5) a stapler

The students used their observation skills to answer the following questions, when appropriate, in order to group the attributes of the object into physical, behavioural and environmental classes.

ATTRIBUTE CLASS	QUESTIONS
Physical	What can you see? What do you feel? What do you hear? What do you smell? What do you taste?
Behavioural	What does the object do? (From direct observation and from past experiences with the object) What is the object's function?
Environmental	Where does the object do it? (In a physical environment and/or an emotional climate) Where could the object possibly be found?

Choosing an attribute from each class, the students combined them into descriptive sentences about the object. Sentences of varied syntactical complexity were composed by varying the attribute class with which the sentence was begun.

A tree-diagram organizer was taught to the students as a way of

identifying the main and sub-categories of an object to be described. When each main category had been broken down appropriately into its sub-categories, the physical, behavioural and environmental attributes were identified for each. Working in small groups of their own choosing, the students generated a list of possible words that described each class of attributes. All the vocabulary thus developed was shared with all the grade seven classes taught by the researcher and recorded on a master tree-diagram that remained on display until all paragraphs were finished. For each sub-category of the object being described, the most powerful words which conveyed the main impression were combined in sentences of varying patterns.

A detailed instructional sequence for teaching students the use of the tree-diagram as an organizer for literary descriptive writing is presented in Chapter 5. Student activities that match steps in the sequence, as well as the procedure the students followed to write descriptive paragraphs, are also presented in the following chapter.

The students used the tree-diagram as an organizer to write 6 descriptive paragraphs during the school year. The paragraphs described 2 concrete objects and 4 pictures.

In early October, both the control and treatment groups were presented with a colour scene of a hamlet on the edge of a lake nestled among hills, covered in trees in autumn shades. Neither group had received any instruction in descriptive writing at that point in the school year. All students were told by the researcher that they would probably enjoy seeing the growth in their writing abilities over the year and, to that end, they were simply

asked to describe the picture presented to them. They were also told that toward the end of the school year they would be asked to describe the picture again at which time they could compare their two compositions. In early June, both instructional groups were presented with the same picture, reminded of the purpose of the activity and asked once again to describe the picture, remembering all that they had learned about descriptive writing. All students from both instructional groups participated in the fall and spring writing activities. None of the students was aware that a study was being conducted. The October paragraphs constituted the pretest and the June paragraphs represented the post test for student descriptive writing.

Attitude Survey Group

The attitude survey was administered in June, in a regular Language Arts period, after the post test paragraphs were completed. All students in the two instructional groups participated under the direction of an impartial staff member.

The students were told that the survey would help the staff to know how they felt about writing. The format was explained to them and they were allowed to practise responding to a sample stimulus statement. Students were asked to respond as honestly and precisely as possible to each of the statements in the survey. They were assured that there were no right or wrong answers, and that the information gained would be used only for determining student attitude toward writing.

MEASUREMENT FOR HYPOTHESIS 1, 2 AND 3

Holistic and analytical evaluation procedures were used to score the descriptive paragraphs used in the study. A sample of the

scoring sheet used appears in Appendix 1. A score for each variable investigated for each paragraph was calculated by summing the values of each of its Likert scales. An average of the scores assigned by three raters on each variable provided the mean scores used for statistical analysis.

VARIABLE EXPLANATION

General Impression (Variable I) (Holistic Evaluation)

The rater was asked to read through the paragraph without stopping to analyze the paragraph and rate it on a 4 point Likert scale.

1 = poor
2 = fair
3 = good
4 = very good

Thought Organization (Variable II) (Analytical Evaluation)

This variable had three parts: Main Impression, Sub-Categories and Sub-Sub-Categories.

Main Impression (2) refers to the affect component of descriptive writing: the feeling the writer wishes his reader to have about the scene being described. It was scored on a 4 point Likert scale.

0 = Not Established (a feeling about the scene was not stated or consistently implied by any means)

1 = Stated, Not Supported (a feeling the writer wants the reader to have about the picture is stated or implied but the elements of the picture described and the language chosen does not convey that feeling)

2 = Some Detail Support (the feeling is stated or implied and some of the elements of the picture and the language chosen for description convey that feeling to the reader)

3 = Most Detail Support (the feeling about the picture that the writer wishes to convey to the reader is stated or implied and most of the components of the picture and the language chosen for description convey that feeling)

4 = Well Conveyed (the reader, through the components of the picture and language chosen for description, is left with the feeling about the picture that the author is trying to convey)

Sub-Categories (3) deals with the major classes of things or elements which go together to form the composition of a picture. (See the labels in bubbles in the tree-diagram used by the treatment group in Appendix 2). It was scored on a 3 point Likert scale.

0 = None (the writer describes the picture in global terms not isolating major parts of the picture for description)

1 = Some (the writer has identified some of the major parts in the picture and described them)

2 = Most (most of the major elements in the picture are identified and described)

3 = All (all of the major elements in the picture are identified and described)

Sub-Sub-Categories (4) is concerned with the reclassification of the sub-categories or major elements of the picture into their component parts. It was scored on a 3 point Likert scale.

0 = None (the author describes the picture in a global, general fashion, not describing any of the detail of the picture). The 0 score was included to account for students who tended to write about the picture in the narrative rather than a a descriptive mode.

1 = Some (the writer identifies some of the parts of the sub-categories in the picture and describes them)

2 = Most (the writer identifies most of the parts of the sub-categories in the picture and describes them)

3 = All (the writer identifies all the components of the sub-categories of the picture for description).

Descriptive Elements (Variable III) (Analytical Evaluation)

This variable is concerned with the writer's use of:

Active Verbs (5) Those verbs that convey to the reader most powerfully, in keeping with the main impression, what the subjects of the sentences are doing.

Specific Nouns (6) refers to the appropriate labelling of objects, events and emotions which combine to make up the picture.

Adjectives (7) refers to the frequency and appropriateness of single word noun descriptors.

Adverbs (8) refers to the frequency and appropriate use of single word adverb, verb and adjective descriptors.

Phrases (9) refers to the frequency and appropriate use of adjective and adverb phrases.

Clauses (10) refers to the frequency and appropriate use of all classes of clauses.

Similes (11) and Metaphors (12) refers to the frequency and appropriate use of these figures of speech.

All the descriptive elements were scored on a 4 point Likert scale.

0 = None (no use was made of the element)

1 = Poor (the element was used infrequently and/or inappropriately)

2 = Fair (the element was used fairly frequently and/or sometimes inappropriately)

3 = Good (the element was used quite frequently and/or usually appropriately)

4 = Very Good (the frequency of the use of the element added to and did not distract from the description. It was used appropriately in all cases.)

INTER-RATER RELIABILITY

In June, 3 experienced Language Arts teachers took part in a preparation session prior to the rating of the study paragraphs. They were presented with a picture of a kitten trapped in a tree which the students had described earlier along with a copy of the tree-diagram the students had developed to match the picture. The main impression the students were trying to convey was explained. The raters were given typed, uncorrected, randomly ordered, above average, average and below average descriptive paragraphs (rated by the investigator) of the kitten. The criteria for evaluation were discussed before and after the scoring of each passage until the scoring variance among the 3 raters on each of the variables investigated was no greater than 1 Likert scale value.

STUDY SCORING PROCEDURE

Later in June, prior to evaluating the paragraphs used in the study, the raters studied the test picture stimulus. The main impression to be conveyed was identified. The raters were also presented with the collectively produced tree-diagram which was used by the treatment group students to describe the picture. (See Appendix 2) The raters scored 60 typed, uncorrected student paragraphs, 30 in each of two successive evening sessions. The paragraphs were randomly ordered so that the rater was unaware of the sex of the writer or whether the paragraph was a pre or post test performance of either a treatment or control group student.

Samples of pre and post test above average, average and below average descriptive paragraphs from both the control and treatment groups appear in Appendix 3.

MEASUREMENT FOR HYPOTHESIS 4

In order to test the above hypothesis, concerned with student attitude toward writing, a semantic differential attitude test was designed by the researcher according to principles identified by Osgood, et al. (1957). The survey consisted of 10 stimulus statements to which the 123 students in both instructional groups were asked to respond.

A. Usually when I have to do any writing I feel:

B. Thinking about what I want to say before I write, makes me feel:

C. Writing a descriptive paragraph is:

D. Putting my thoughts down on paper is:

E. Planning and organizing my ideas on paper before I write is:

F. Playing with language in order to convey a message in the most effective way to my reader is:

G. Having a writing plan to follow is:

H. When I plan before I write, my writing is:

I. Being able to write well is:

J. I feel that being taught how to plan well is:

Six polar adjectives indicative of attitudes were used for each of the above stimuli. There were five blanks between adjectives and students checked the blank which most closely approximated how they felt about each stimulus statement. Responses were scored according to the following scheme.

1 = negative
2 = tends to be negative
3 = neutral
4 = tends to be positive
5 = positive

By summing the values for the six responses, a score was determined for each stimulus statement.

A sample of the attitude survey is presented in Appendix 4.

DATA TREATMENT

In keeping with the Research Hypotheses (1), (2), (3) and (4), the following statistical hypotheses were formulated.

Statistical Hypothesis (1)

Null Hypothesis. $H_{0_1}: \mu_{1T} = \mu_{1C}$

Alternative Hypothesis. $H_{A_1}: \mu_{1T} > \mu_{1C}$

where μ_{1T} is the population mean of the treatment group on General Impression (Variable I on the score sheet)

and μ_{1C} is the population mean of the control group on General Impression.

Statistical Hypothesis (2)

Null Hypothesis. $H_{0_2}: \mu_{2T} = \mu_{2C}$

Alternative Hypothesis. $H_{A_2}: \mu_{2T} > \mu_{2C}$

where μ_{2T} represents the population mean of the treatment group on Thought Organization (Variable 2 on the score sheet)

and μ_{2C} represents the population mean of the control group on Thought Organization.

Statistical Hypothesis (3)

Null Hypothesis. $H_{0_3}: \mu_{3T} = \mu_{3C}$

Alternative Hypothesis. $H_{A_3}: \mu_{3T} > \mu_{3C}$

where μ_{3T} represents the population mean of the treatment group on Descriptive Elements

and μ_{3c} represents the population mean of the control group on Descriptive Elements.

Statistical Hypothesis (4)

Null Hypothesis. $H_{o_4}: \mu_{4T} = \mu_{4C}$

Alternative Hypothesis. $H_{A_4}: \mu_{4T} > \mu_{4C}$

where μ_{4T} = the population frequencies of positive responses of the treatment group

and μ_{4C} = the population frequencies of positive responses of the control group.

In order to establish whether the two instructional groups were similar before intervention, a t-test comparison of the treatment and control group pre test mean scores on General Impression, Thought Organization and Descriptive Elements was carried out.

A t-test calculation was performed on the treatment and control group post test mean scores on the above three variables to determine if there were any significant treatment effects between the two instructional groups.

In order to determine whether the treatment operated differentially across ability sub-groups, an analysis of covariance was carried out using the appropriate pre test score as the covariate.

The strength of the effect of the treatment was investigated by determining the per cent of learning gain by using the procedure suggested by Gagne, Foster and Crawley (1948). The following equation was used:

$$\text{per cent of possible learning} = \frac{\text{treatment group mean post test score} - \text{control group mean post test score}}{\text{total possible score} - \text{control group mean post test score}} \times 100$$

To test the hypothesis of equal positive responses, a chi square value was calculated for each stimulus statement in the attitude survey.

CHAPTER 5

IMPLEMENTATION OF THE TREE-DIAGRAM ORGANIZER

INSTRUCTIONAL SEQUENCE

Table 3 presents the steps that were followed to instruct grade seven students in the use of the tree-diagram as an organizer for literary descriptive writing. The instructional sequence is shown as a growth strand which represents behaviours children will display after instruction from a low level of identifying attributes of objects to a complex level of using the procedure to write in a literary descriptive mode about any experience. The starred steps indicate places where sub-skills are embedded in the major skill and which, if not mastered, may cause a break-down in learning at that point. Each sub-skill has been further growth stranded so that if a student does display difficulty at any of these points a teacher may refer to the sub-strand in order to make an appropriate instructional decision to ensure growth in the student's ability to write descriptively.

The major learning sequence was refined and steps added as the researcher observed students working at the activities designed to move them along the growth strand.

STUDENT ACTIVITIES

It is not realistic to devise an activity to match each step in the growth strand. Some of the activities that appear in Table 4 represent large steps along the learning sequence. Should any student experience difficulty which practice does not remedy, the teacher may refer to the growth strand and devise an activity to deal with the specific step causing the problem.

TABLE 3

INSTRUCTIONAL SEQUENCE FOR TEACHING THE USE OF THE TREE-DIAGRAM ORGANIZER FOR LITERARY DESCRIPTIVE WRITING.

1.13 Can repeat procedure to describe any familiar topic at any level of abstraction suitable to writer's stage of cognitive development

1.12 Can repeat procedure with a complex picture stimulus building in writing techniques that give impact to the main impression.

1.11 Can repeat procedure with a complex picture stimulus.

1.10 Can repeat procedure with a simple picture as a stimulus.

*1.9 Can sequence all sentences about object to be described in some logical order to give main impression greatest impact.

1.9

(v) Can sequence sentences about components of object being described along some appropriate dimension to add impact of main impression.

(iv) Can identify appropriate dimension along which components of object can be described to add to main impression.

(iii) Can seriate and reseriate objects along a variety of appropriate dimensions.

(ii) Can reseriate same objects along another dimension.

(i) Can seriate objects along one dimension.

(0) Cannot seriate objects along any dimension.

1.8 Can choose rich precise vocabulary and figures of speech for sentences to insure impact of main impression.

1.7 Can combine physical, behavioural and environmental attributes of components of object to be described in a variety of sentence patterns to produce several descriptive sentences in keeping with main impression.

1.6 Can identify the physical, behavioural and environmental attributes of all subcomponents of object to be described in light of main impression using a tree-

1.5

(iii) Can generate a list of synonyms for main impression.

(ii) Can classify experiences and identify main impression of object.

(i) A variety of affect-laden experiences with object.

(0) No experiences with object.

diagram organizer.

*1.5 Can identify main impression of concrete object to be described and generate a list of related synonyms.

*1.4 Can identify main and subcomponents of concrete object to be described using a tree-diagram organizer.

*1.3 Can combine physical, behavioural and environmental attributes in a variety of ways to produce a variety of sentence patterns with varied syntactical complexity.

1.2 Can combine physical, behavioural and environmental attributes to form a descriptive sentence about an object.

*1.1 Can identify physical, behavioural and environmental attributes of a concrete object.

1.0 No conscious pre-writing procedure employed.

1.4

(iv) Can exhaustively sub-classify an object into component parts using a tree-diagram to record information.

(iii) Can exhaustively re-classify the same collection of objects according to several self-selected criteria and record the information simultaneously in a tree-diagram.

(ii) Can exhaustively re-classify the same collection according to another self-selected criterion using a simple classification. e.g. size chart to record information.

(i) Can exhaustively classify a collection of objects according to self-selected criterion using a simple classification chart to record information. e.g. colour.

(0) Can identify attributes of objects.

1.3

(iv) Can write varied sentence patterns with varied syntactical complexity by manipulating position in sentence of one or more elements from each attribute class.

(iii) Can write a sentence which includes one element from each attribute class beginning with a behavioural or environmental attribute to form a variety of sentence patterns.

(ii) Can write simple sentences (subject, verb pattern) each containing one attribute - physical or behavioural or environmental.

1.1

(v) Can identify physical, behavioural and environmental attributes of object.

(iv) Can identify physical, behavioural attributes and where it is found or in what emotional environment (environmental).

(iii) Can identify physical attributes, what an object does and its function (behavioural).

(ii) Can identify physical attributes and what an object does.

(i) Can label what is seen, heard, felt, smelled and tasted (appropriately) about an object (physical).

(0) Cannot identify physical, behavioural or environmental attributes.

* Embedded Instructional Growth Strand

There are several activity components which a teacher may manipulate in order to control the complexity of the task. The Information Source identifies the materials with which students interact in order to acquire some learning. The Level of Difficulty indicates the number of familiar or unfamiliar elements with which students deal at any one time at a concrete, pictorial or abstract level. The Grouping recommended for students, as they work at an activity, is one or a combination of individual, small group or large group. The Activity directions, for large groups, are written to the teacher; otherwise, they are written on an activity card as it would appear to a student in a learning centre in the classroom. The Evaluation component for each activity corresponds to objectives identified in a growth strand for major learnings in each of the Knowledge, Skill and Affect domains. The Knowledge and Affect growth strands and the Objective column have been omitted as they are beyond the scope of the concerns of this chapter. It is understood, however, that no skill is acquired in isolation and teachers must attend to the Knowledge and Affect components tied to the learning of a particular skill.

In the activities that follow, the Information Source deals only with concrete and pictorial stimuli that have high familiarity and low numerosity. The activities presented were designed for a specific group of children with specific needs. The pupils had not been exposed to programs that made a deliberate attempt to promote their cognitive growth. It was deemed advisable, therefore, considering the amount of learning involved in writing well descriptively, to control the difficulty of each task. For Intermediate students who have been exposed to programs consciously fostering intellectual development, a more sophisticated end

TABLE 4

STUDENT ACTIVITIES CORRESPONDING TO STEPS IN THE INSTRUCTIONAL SEQUENCE FOR TEACHING THE USE OF THE TREE-DIAGRAM ORGANIZER FOR LITERARY DESCRIPTIVE WRITING.

INFORMATION SOURCE	LEVEL OF DIFFICULTY	ACTIVITY	GROUPING	EVALUATION
Large, varied selection of Hallowe'en candy	Concrete Highly Familiar Low Numerosity	ACTIVITY ONE 1. Choose a piece of Hallowe'en candy from the candy dish. 2. Make a list of the attributes you discover. 3. Classify the attributes using a simple classification chart like this: see | feel | taste | smell | hear	Small Group	KNOWLEDGE: Student knows that a major component of description is physical attributes. SKILL: Student can label what is seen, heard, felt, smelled and tasted about a piece of Hallowe'en candy. AFFECT: Self-confidence is high because student ability to perform is established. The student observes physical attributes of objects successfully, daily.
Varied selection of household and school objects	Concrete Highly Familiar Low Numerosity	ACTIVITY TWO (TEACHER) 1. Choose any familiar object. 2. Have children generate randomly all the attributes of the object cueing them to talk about what the object does or what its function is as well as places where it is found. 3. Record the findings on the blackboard classifying them	Large Group	KNOWLEDGE: The teacher identifies for the students that all objects can be identified by physical, behavioural and environmental attributes. SKILL: Students can identify physical, behavioural and environmental attributes and consciously classify them as such

TABLE 4 (cont'd)

INFORMATION SOURCE	LEVEL OF DIFFICULTY	ACTIVITY TWO (TEACHER)(cont'd)	GROUPING	EVALUATION
		according to physical, behavioural and environmental attributes without using labels. 4. When the list is exhaustive, ask the children to offer reasons why you have grouped the attributes as you have. Draw from them the labels "physical", "behavioural" and "environmental" and establish criteria for placing attributes in each class.		with teacher guidance. AFFECT: The student's self-confidence is high even though ability to perform is only somewhat established. The student has used a similar procedure for identifying attributes for objects in a similar task.
Variety of household and school objects	Concrete Highly Familiar Low Numerosity	ACTIVITY THREE 1. Choose any object from the table. 2. Identify as many of its attributes as you can. 3. Record your information in a simple classification chart like this: Physical | Behavioural | Environmental 4. Write three simple sentences about the object for each class of attributes. 5. Combine one sentence from each	Individual ↓ Small Group	KNOWLEDGE: (a) The student knows that description includes a wide variety of obvious and less obvious physical, behavioural and environmental attributes. (b) The student knows that physical attributes provide verb parts; environmental attributes provide verb part descriptors. SKILL: Student can combine physical, behavioural and environmental attributes to form a descriptive sentence about an object.

TABLE 4 (cont'd)

INFORMATION SOURCE	LEVEL OF DIFFICULTY	ACTIVITY THREE (cont'd)	GROUP-ING	EVALUATION
		class of attributes into one interesting sentence about your object. 6. Make several other interesting sentences about your object. 7. Share them with a friend. 8. Have you included an attribute from each class in your sentences?		AFFECT: Student's self-confidence is high even though his ability is only somewhat established. He has produced his own sentences using subject, verb parts successfully before.
		ACTIVITY FOUR		
Several sentences produced in Activity Three	Abstract Highly Familiar	1. Combine the simple sentences about your object, putting a "behavioural" attribute at the beginning of the sentence. 2. Rewrite the same sentence beginning it this time with an environmental attribute. 3. Rewrite your other interesting sentences beginning them with a behavioural and then an environmental attribute of your object.	Individual	KNOWLEDGE: Students know that good description include precise language and varied sentence patterns. SKILL: The student can combine physical, behavioural and environmental attributes in a variety of sentence patterns. AFFECT: Student's self-confidence is high even though his ability is only somewhat established. He has used this procedure successfully before in a similar situation with assistance.

TABLE 4 (cont'd)

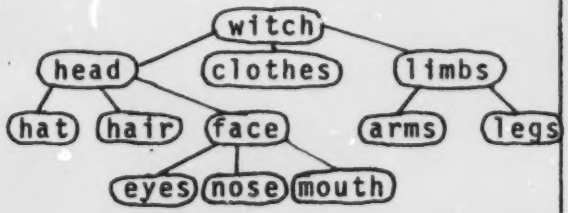
INFORMATION SOURCE	LEVEL OF DIFFICULTY	ACTIVITY	GROUPING	EVALUATION
		ACTIVITY FIVE (TEACHER)		
-Newspaper -Black panty hose (2 pair) -needle -thread -large brown bag -green paint -black construction paper -blackboard -compass	Concrete Highly Familiar Low Numerosity	1. Have students construct from available appropriate sources a large witch to be hung from the classroom ceiling. 2. With the students, decide on the parts (components) of the witch to be included in a description. 3. Introduce the tree-diagram as an organizer. (Assumption: students have worked with tree-diagram in other contexts)  4. With the whole class, identify how the witch makes them feel - (They will probably suggest she is funny) 5. With the class, generate a list of "funny" synonyms. 6. With class, generate the language needed in the description using the P.B.E. procedure on each sub-component in the tree-	Large Group	KNOWLEDGE: The teacher identifies for the student that description is built around a main impression with attribute detail to support it. The teacher identifies for the student that description includes sentences of varied syntactical complexity using rich and precise language related to a main impression. SKILL: The students can identify the main and sub-components of a concrete object to be described using a tree-diagram organizer with teacher guidance. SKILL: The students can identify the main impression of the concrete object to be described and generate a list of related synonyms with teacher guidance. SKILL: Students can identify the physical, behavioural and environmental attributes of all sub-components of object to be described in light of main impression using a tree-diagram organizer with teacher guidance.

TABLE 4 (cont'd)

INFORMATION SOURCE	LEVEL OF DIFFICULTY	ACTIVITY FIVE (TEACHER)(cont'd)	GROUPING	EVALUATION
		diagram. 7. When the behavioural attributes are being identified, introduce the "how" component. This will provide the writers with adverbs. Many of these adverbs will come from the main impression synonym list. This will allow students to relate each sentence they generate to the main impression. 8. With the whole class, generate sentences by taking a physical, behavioural, "how" and environmental element and combining them into descriptive sentences about the witch related to the "funny" main impression.		SKILL: Students can combine physical, behavioural and environmental attributes of components of object to be described in a variety of sentence patterns to produce several descriptive sentences in keeping with main impression with teacher guidance. AFFECT: The student's confidence remains high even though ability to perform is only somewhat established for the task. The students can use a tree-diagram to write a good descriptive paragraph with teacher guidance.
		ACTIVITY SIX		
-witch -tree-diagram organizer	Concrete ↓ Pictorial ↓ Abstract Highly Familiar	1. Using the tree-diagram organizer that the class generated for the witch, write the last four sentences to complete the description. 2. Share your sentences with a friend. 3. Check to see if your friend has included a "P", "B", "how" and "E" part in each sentence.	Individual ↓ Small Group.	KNOWLEDGE: The student knows that description includes sentences with rich, precise language related to a main impression. SKILL: The student can combine physical, behavioural and environmental attributes of components of object to be described to produce several

TABLE 4 (cont'd)

INFORMATION SOURCE	LEVEL OF DIFFICULTY	ACTIVITY SIX (cont'd)	GROUPING	EVALUATION
	Low Numerosity	4. Check to see that each sentence is related to the main impression. 5. Help each other make any necessary changes. 6. Share your paragraph with the class.		descriptive sentences in keeping with the main impression. AFFECT: The student's self-confidence is high even though his ability to perform is only somewhat established. He has used this procedure before successfully with teacher assistance.
		ACTIVITY SEVEN		
Collection of several appropriate concrete objects	Concrete Highly Familiar Low Numerosity	1. Choose any object you wish from the table. 2. Identify the main and sub-components of the object which any good description would include. 3. Use the tree-diagram as your organizer. 4. Identify a main impression for the object. 5. Generate a list of main impression synonyms. 6. Use a thesaurus. 7. Share your work with a classmate who has worked with the same object.	Individual ↓ Small Group	KNOWLEDGE: The student knows that good description is based on a global search of attributes which can be generated after the main components and sub-components of an object have been identified. SKILL: Student can identify the main and sub-components of a concrete object to be described using a tree-diagram organizer. SKILL: The student can identify the main impression of a concrete object to be described and generate a list of related synonyms.

TABLE 4 (cont'd)

INFORMATION SOURCE	LEVEL OF DIFFICULTY	ACTIVITY SEVEN (cont'd)	GROUP-ING	EVALUATION
		8. Would you make any changes in your work? Why?		AFFECT: The student's self-confidence is high, even though his ability to perform is only somewhat established. He has used the procedure before successfully with teacher assistance to identify main and sub-components of an object as well as the main impression.
		ACTIVITY EIGHT		
-witch paragraph student completed	Abstract	1. Using your witch paragraph rewrite every second sentence in a different sentence pattern. 2. Begin with either a behavioural or environmental attribute. 3. Share your paragraph with a group of friends.	Individual ↓ Small Group	KNOWLEDGE: The student knows that good description includes sentences of varied syntactical complexity. SKILL: The students can write a variety of descriptive sentences in a variety of patterns to maintain reader interest in a descriptive paragraph. AFFECT: The student's self-confidence is high because his ability to perform is assumed. He has produced, independently and successfully, varied syntactically complex descriptive sentences before in a somewhat similar task.

TABLE 4 (cont'd)

INFORMATION SOURCE	LEVEL OF DIFFICULTY	ACTIVITY	GROUP-ING	EVALUATION
		ACTIVITY NINE		
-student generated examples of common similes -student generated list of subjects for description e.g., -butterfly -train -house	Abstract	1. Introduce the figure of speech "simile". 2. Have students generate a list of similes in common usage - e.g. - fat as a pig - runs like a deer 3. Choose several subjects and have children generate less obvious examples of similes.	Large Group	KNOWLEDGE: The teacher identifies for the student that good description includes a variety of figures of speech relating subject to other elements in the world. One figure of speech is the simile. The teacher identifies for the student that similes are based on similarities of attributes of two different elements. These can be physical or environmental. SKILL: The students can generate lists of obvious and less obvious examples of similes to produce rich description about an object with teacher assistance. AFFECT: Student self-confidence is high. Student has done the same task before successfully.
		ACTIVITY TEN		
-several descriptive paragraphs	Abstract	1. Read the descriptive paragraphs in your kit. 2. For each identify: -subject	Small Group	KNOWLEDGE: The student knows that good description includes similes and rich language that gives impact to main impression.

82

TABLE 4 (cont'd)

INFORMATION SOURCE	LEVEL OF DIFFICULTY	ACTIVITY TEN (cont'd)	GROUPING	EVALUATION
		-main impression -rich language -similes 3. Record your information in a cross-classification chart. 4. Which paragraph did your group prefer? Why?		SKILL: Students can identify a main impression, rich language that conveys main impression and similes in other authors' writings. AFFECT: The student's self-confidence is high because his ability to perform is established. He has done the same task before.
		ACTIVITY ELEVEN		
-Witch paragraph	Abstract	1. Reread the witch paragraph. 2. Add three appropriate similes to the paragraph. 3. Make sure at least one is a simile related to a behavioural attribute. 4. Share your sentences with similes with your group. 5. Were some similes better than others? Why?	Individual ↓ Small Group	KNOWLEDGE: The student knows that good description includes similes which relate the subject to another element in the world, based on similar physical or environmental attributes. SKILL: Students can develop similes related to physical and behavioural attributes of subject in order to ensure impact of main impression. AFFECT: The student's self-confidence is high even though student's ability to perform is only somewhat established. He has developed similes with assistance for a simile task.

TABLE 4 (cont'd)

INFORMATION SOURCE	LEVEL OF DIFFICULTY	ACTIVITY	GROUPING	EVALUATION
		ACTIVITY TWELVE (TEACHER)		
-individual witch paragraphs	Abstract	1. Have class recall the main impression of the witch. 2. Have students cut their paragraphs of the witch into sentences. 3. Have them arrange the sentences in a way they think conveys the main impression best to the reader. Answers will vary: i) top - bottom (space dimension) ii) bottom - top (as viewed by a young child) iii) start with part that is funniest (focal point) iv) funniest part at the last.	Individual ↓ Large Group	KNOWLEDGE: The student knows that a main impression can be conveyed effectively in a variety of ways. SKILL: (i) Student can sequence sentence in some defensible logical order. (ii) Students can sequence sentences in an order that gives the main impression the greatest impact. There is no right or wrong response but children may agree that focal point (face) left to the last is often most effective. This is a matter of style.
		ACTIVITY THIRTEEN		
-Real Christmas tree -student made decoration	Concrete ↓ Abstract	1. Write a descriptive paragraph about the Christmas tree. 2. Decide what the main impression is going to be. 3. Make a list of synonyms for the main impression	Small Group ↓ Individual	KNOWLEDGE: the student knows the attributes of a good descriptive paragraph. SKILL: The student can use the procedure outlined in the activity card to produce a good descriptive paragraph (according to identified criteria).

TABLE 4 (cont'd)

INFORMATION SOURCE	LEVEL OF DIFFICULTY	ACTIVITY THIRTEEN (cont'd)	GROUPING	EVALUATION
		4. Find the components and sub-components of the tree using the tree-diagram as your organizer. 5. Generate the rich language that describes the physical, behavioural, "how" and environmental attributes. 6. Include "similes" in your attributes. 7. Combine the attributes into sentences. 8. Remember to create a variety of sentence patterns. 9. Decide where you are going to state your main impression. 10. Sequence your sentences so that the main impression makes the greatest impact on your reader.		KNOWLEDGE: The student knows the attributes of a good descriptive paragraph. SKILL: The student can use the procedure outlined in the activity card to produce a good descriptive paragraph (according to identified criteria) appropriate to an Intermediate level. AFFECT: The student's self confidence is high even though his ability to perform is only somewhat established. He has successfully performed all skills in descriptive writing with assistance for similar tasks.
		ACTIVITY FOURTEEN		
Picture of an animal	Pictorial	1. Write a descriptive paragraph about the animal picture you have chosen using the procedure you used for the Christmas tree paragraph.	Individual	KNOWLEDGE: The student knows the attributes of a good descriptive paragraph. SKILL: The student can use the established procedure to write a descriptive paragraph about

TABLE 4 (cont'd)

INFORMATION SOURCE	LEVEL OF DIFFICULTY	ACTIVITY FOURTEEN (cont'd)	GROUP-ING	EVALUATION
				an animal. AFFECT: Student's self-confidence is high even though his ability to perform is only assumed. He has successfully performed independently the skills involved in descriptive paragraph writing.

point for the descriptive writing growth strand might be identified. As well, altering the degree of abstractness of some of the activities may be appropriate.

PROCEDURE

Table 5 outlines a procedure to help students consciously attend to certain operations at the appropriate time when writing descriptive paragraphs.

TABLE 5

A PROCEDURE FOR USING THE TREE-DIAGRAM ORGANIZER FOR LITERARY DESCRIPTIVE WRITING

1. Study the picture and identify the focal point.
2. Identify the main impression of the focal point.
3. Make a list of all the synonyms for the main impression.
4. Start making the tree-diagram by looking at the components of the picture.
5. Break the main components down into their parts until you do not need to go any further.
6. Make sure the focal point of the picture is broken down completely.
7. Generate rich language by doing a P B (How) E on each small part of the picture including similes and metaphors.
8. Start writing by introducing the setting and main impression. (This is just <u>one</u> way.)
9. Write at least one good sentence about each part of the picture including one element from each class of attributes. Vary sentence patterns.
10. Sequence the sentences so that the main impression has the greatest impact on the reader.

CHAPTER 6

RESULTS

T-TEST ANALYSIS

Hypothesis (1)

Table 6 shows that there was no significant difference at the .05 level of confidence between the two instructional groups on General Impression before instruction began. A post test comparison of the mean scores between treatment and control groups showed there was a significant difference between the two groups after intervention.

TABLE 6

SUMMARY OF RESULTS OF T-TEST OF PRE AND POST TEST MEAN SCORES ON GENERAL IMPRESSION FOR TOTAL TREATMENT AND CONTROL GROUPS

VARIABLE	GROUP	TEST	N	MEAN	STANDARD DEVIATION	T VALUE	df	2-tail p	1-tail p
GENERAL IMPRESSION	T	pre	15	0.8933	0.623	1.17	26	.251	
	C	pre	13	0.6631	0.357				
	T	post	15	3.1067	0.916	8.17	20.35		0.000
	C	post	13	0.9462	0.425				

Hypothesis (2)

Similarly, Table 7 shows there was no significant difference between the treatment and control groups' pre test scores on Thought Organization. The t-test comparison of treatment and control group post test mean scores reveals a significant difference at the .05 level of confidence between the two groups after intervention.

TABLE 7

SUMMARY OF RESULTS OF T-TEST ANALYSIS OF PRE AND POST TEST MEAN SCORES OF TREATMENT AND CONTROL GROUPS ON THOUGHT ORGANIZATION

VARIABLE	GROUP	TEST	N	MEAN	STANDARD DEVIATION	T VALUE	df	2-tail p	1-tail p
THOUGHT ORGANI-ZATION	T	pre	15	2.8867	1.226	-1.31	28	.201	
	C	pre	15	3.5447	1.512				
	T	post	15	8.2200	1.679	7.68	28		0.000
	C	post	15	4.2000	1.136				

Hypothesis (3)

The results of the t-test analyses of pre and post test mean scores for the two instructional groups on Descriptive Elements are summarized in Table 8. There was no significant difference between the treatment and control pre test mean scores but a significant difference appears after a t-test on the post test mean scores on Descriptive Elements for the two instructional groups.

TABLE 8

SUMMARY OF RESULTS OF T-TEST ANALYSIS OF PRE AND POST TEST MEAN SCORES OF TREATMENT AND CONTROL GROUPS ON DESCRIPTIVE ELEMENTS

VARIABLE	GROUP	TEST	N	MEAN	STANDARD DEVIATION	T VALUE	df	2-tail p	1-tail p
DESCRIPTIVE ELEMENTS	T	pre	15	6.8600	3.226	2.02	27	.053	
	C	pre	14	4.8643	1.864				
	T	post	15	21.1333	6.856	8.74	15.49		0.000
	C	post	15	5.2467	1.584				

ANALYSIS OF COVARIANCE

The results of an analysis of covariance on the three variables for the three ability groups using the appropriate pre test score as the covariate are summarized in Table 9.

TABLE 9

SUMMARY OF POST TEST RESULTS OF ANALYSIS OF COVARIANCE ON THREE VARIABLES FOR THREE ABILITY SUB-GROUPS USING THE APPROPRIATE PRE TEST SCORE AS COVARIATE

	VARIABLES	SUM OF SQUARES	df	MEAN SQUARE	F	p
ABOVE AVERAGE	General Impression	11.132	1	11.132	62.279	0.000
	Thought Organization	91.077	1	91.077	102.895	0.000
	Descriptive Elements	630.099	1	630.099	453.587	0.000
AVERAGE	General Impression	14.698	1	14.698	32.019	0.001
	Thought Organization	31.948	1	31.948	21.859	0.002
	Descriptive Elements	468.665	1	468.665	33.759	0.001
BELOW AVERAGE	General Impression	4.989	1	4.989	7.681	0.032
	Thought Organization	9.409	1	9.409	4.644	0.068
	Descriptive Elements	247.090	1	247.090	11.515	0.012

There is a significant difference at the .05 level between the post scores of the above average ability treatment and control groups for General Impression, Thought Organization and Descriptive Elements.

The same results appear for the average ability groups on the three variables.

There is a significant difference between the post scores of the below average ability treatment and control groups on General Impression and Descriptive Elements but there is no significant difference between the two below average groups on Thought Organization after intervention.

STRENGTH OF EFFECT OF PROGRAM 120

A summary of the per cent of possible learning scores is presented in Table 10. The whole treatment group showed 70.75 per cent

learning gain in General Impression, 69.3 per cent for Thought Organization and 59.38 per cent for Descriptive Elements of the total possible learning gain that might have occurred due to the intervention program.

The Average students in the treatment group showed a 75.47 per cent learning gain in Main Impression, 59.08 per cent in Thought Organization and 57.45 per cent in Descriptive Elements.

The below average treatment students showed a 47.91 per cent gain in Main Impression, 49.43 per cent in Thought Organization and 38.91 per cent in Descriptive Elements.

TABLE 10

SUMMARY OF RESULTS OF PER CENT OF POSSIBLE LEARNING FOR WHOLE TREATMENT GROUP AND THREE ABILITY SUB-GROUPS ON THREE VARIABLES

GROUP	VARIABLES		
	Main Impression	Thought Organization	Descriptive Elements
Whole Group	70.75	69.3	59.38
Above Average	90.55	96.71	83.5
Average	75.47	59.08	57.45
Below Average	47.91	49.43	38.91

ATTITUDE SURVEY

Response options 1 and 2 as well as options 4 and 5 were collapsed to render more confidence to the chi square statistic.

Hypothesis (4)

There was a significant difference at the .05 level of confidence between the frequency of positive attitude responses for the

treatment and control groups for 8 of the 10 stimulus statements. The treatment group tended to respond in a more positive way than the control group.

There was no significant difference between the distribution of responses of the two instructional groups for the stimulus, "Writing a descriptive paragraph is:". The highest percentage of treatment group responses tended to be positive. There was also no significant difference between distribution of responses of the treatment and control groups for stimulus, "Being able to write well is:". Both groups' responses showed a positive trend. These results are summarized in Table 11.

TABLE 11

SUMMARY OF RESULTS OF CHI SQUARE ANALYSIS OF FREQUENCY DISTRIBUTION OF RESPONSES OF TREATMENT AND CONTROL GROUPS TO THE SEMANTIC DIFFERENTIAL ATTITUDE SURVEY

Question	Group	Option % 2	3	4	Chi Square	df	p
Usually when I have to do any writing I feel:	T C	9.2 44	20.4 24	70.4 32	19.66451	2	0.0001
Thinking about what I want to say before I write makes me feel:	T C	12.2 32	15.3 36	72.5 32	14.22636	2	0.0008
Writing a descriptive paragraph is:	T C	26.5 44	25.5 32	48 24	4.98707	2	0.0826
Putting my thoughts down on paper is:	T C	16.3 48	19.4 24	64.3 28	13.59484	2	0.0011
Planning and organizing my ideas on paper before I write is:	T C	4.1 40	20.4 32	75.5 28	30.58040	2	0.0000
Playing with language in order to convey a message in the most effective way to my reader is	T C	27.6 48	26.5 36	45.9 12	9.32010	2	0.0095
Having a writing plan to follow is:	T C	6.2 32	14.3 32	79.5 32	22.17029	2	0.0000
When I plan before I write my writing is:	T C	8.2 32	28.6 28	63.2 40	10.54453	2	0.0051
Being able to write well is:	T C	1 8	10.3 12	88.7 80	4.15080	2	0.1255
I feel that being taught how to plan well is:	T C	5.1 24	9.2 4	85.7 72	9.06441	2	0.0108

DISCUSSION

The results of the t-tests showing no significance between the pre test means of the treatment and control groups on the three variables investigated, indicate that the two instructional groups were similar relative to the variables at the beginning of the school year. There were significant differences on all three variables at the end of the intervention period which, therefore, suggest that the treatment group out performed the control group in all three areas. Therefore, H_{o_1}, H_{o_2} and H_{o_3} should be rejected. The statistically significant differences further suggest that the use of the tree-diagram as a pre-writing organizer had a positive impact on the quality of the descriptive paragraphs produced by the treatment group students.

The significant differences, revealed by the analysis of covariance, between the post scores of above average and average ability treatment students on the 3 variables, also supports the suggestion that the use of the tree-diagram as a pre-writing planning strategy improves the quality of grade seven student descriptive paragraph writing. However, the results of the same statistical procedure on the post test scores of below average treatment and control students shows that there was a significant difference between General Impression and Descriptive Elements used but not for Thought Organization. These results indicate that the treatment did not help below average students develop capability in Thought Organization. Therefore, H_{o_2} should not be rejected.

These findings are not surprising when one considers the difficulties below average students have generally with new learnings. Often, they have developed ineffective writing strategies. As

Bereiter (1978) indicates, most students tend to approach school writing tasks by stringing ideas together as they occur to the writer. As well, Emig (1971), Graves (1978) and Mischel (1974) observe that the majority of students, not just those who achieve at a below average level, tend to be concerned mainly with the superficial features of writing. In order to overcome these inappropriate strategies, prior learnings must be extinguished and replaced with those which direct the use of more effective writing techniques. This requires time.

More practice in consciously dealing with thought organization, which the tree-diagram promotes, may be necessary for below average students. For some of these students it also may be necessary to develop a more detailed growth strand for steps at which the new learning is being impeded in the tree-diagram instructional sequence.

Because statistical significance does not necessarily reflect an effect of useful magnitude, the strength of effect of the program was investigated. The per cent of possible learning achieved by the total group and sub-ability groups involved in the intervention program is gratifying, particularly in Thought Organization since this is the greatest weakness student writing displays at this level. (Haynes and Evans, 1979) Given the non-significant result of the analysis of covariance, the learning gain attained by below average treatment students on Thought Organization cannot be attributed to the program.

TABLE 12

SUMMARY OF RESPONSES OF TREATMENT AND CONTROL GROUPS ON ATTITUDE SURVEY CONCERNING WRITING AND PLANNING

GROUP	CONCERN	POSITIVE WITH SIGNIFICANCE	POSITIVE NO SIGNIFICANCE	NEGATIVE WITH SIGNIFICANCE	NEGATIVE NO SIGNIFICANCE	NO TREND WITH SIGNIFICANCE	NO TREND NO SIGNIFICANCE
TREATMENT	Writing	A D F	C I				
	Planning	B E G H J					
	Writing		I	A D F	C	B	
	Planning	J H		E		G	

All of the stimuli concerned with student attitude toward planning prompted statistically significant positive responses from the treatment group. These responses suggest that students view strategies, which enable them to plan effectively, as being valuable. This finding is supported by both Bereiter and Scardamalia (1979) and Odell (1973). These investigators observed that giving students a strategy that they felt helped them in writing gave them a sense of power over the process. In light of the positive trend of the attitude of the treatment group, the lack of significance between treatment and control group responses on the stimulus, "Writing a descriptive paragraph is:" may be explained by the fact that students generally have a negative attitude toward school-sponsored writing tasks. (Emig 1971, Britton, et al. 1978). Although there were choices built into the Language Arts program to which the treatment group was exposed, the fact that the day was segmented into subject periods worked against students being motivated to write because they were strongly moved at that time

to communicate their ideas in written form. Students still viewed the writing assignments as teacher-sponsored.

CHAPTER 7

SUMMARY AND CONCLUSION

SUMMARY

Students, when preparing to write, do not use whole text planning strategies that guide a goal-directed search for information to be presented to the reader in order to meet some purpose. This study was designed to investigate the effects on student writing of a procedure which provided students with such a planning strategy.

The procedure directed students to identify a main impression they wished to convey about a fall scene in a literary descriptive mode. The tree-diagram was used as an organizer that helped students engage in a global search for major and sub-categories to be included in the description. The organizer allowed for the identification of physical, behavioural and environmental attributes of the parts of the picture, as well as the collection of rich language to be used in the communication.

Thirty descriptive paragraphs were used in a 2X2 experimental design study. Fifteen paragraphs which were written by students using a tree-diagram organizer were randomly chosen from the treatment group. Fifteen paragraphs which were written by students emulating good writers were randomly chosen from the control group.

All of the one hundred and twenty-three grade seven Language Arts students, which made up the two instructional groups, responded to a writing attitude survey.

Three independent raters scored the randomly ordered pre and post test, treatment and control group descriptive paragraphs

holistically on General Impression and analytically on Thought Organization and Descriptive Elements. The paragraphs were identified by number only.

A t-test analysis revealed a statistically significant difference at the .05 level between the pre and post test mean scores of the treatment and control groups on all three variables. An analysis of covariance showed a significant difference between treatment and control post test mean scores for above average and average students on the three variables. This same analysis also revealed a significant difference between post test mean scores of treatment and control below average students on General Impression and Descriptive Elements but no significant difference was revealed for Thought Organization.

The per cent of all possible learning achieved by the treatment group on all variables as a result of using the tree-diagram is encouraging but the 49% displayed by the below average group on Thought Organization cannot be attributed to the program because of the non-significant results on this variable in the analysis of covariance.

Treatment students tended to be more positive toward planning than the control students.

CONCLUSIONS

This study suggests that using a tree-diagram as a pre-writing organizer can significantly improve the quality of grade seven literary descriptive paragraphs.

However, if below average students are to benefit from instruction in the use of a tree-diagram organizer as much as above average

and average students, teachers must present its use in such a way that these students see the value in discarding the inefficient writing strategies they currently employ. The instructional sequence used with below average students must contain sufficiently small learning steps as to ensure growth in their ability to organize ideas.

IMPLICATIONS FOR FURTHER RESEARCH

The findings in this study would have to be replicated before any definite conclusions about the benefits of using a tree-diagram as an organizer for literary descriptive writing could be drawn.

The issue of differentiating instruction for descriptive writing for ability groups needs to be investigated. Revisions need to be made to the instructional sequence for literary descriptive writing presented in this paper when it is used with below average students. It would appear that they have less difficulty in developing a tree-diagram for a subject than they do with using it as a guide for the organized presentation in written form of ideas that they have already generated.

The relationships between other organizers and writing genre need to be investigated. For example, an important pedagogical breakthrough in the teaching of composition would be made if significant research results could be found to support the use of the sequence line as an organizer for narrative writing and the cross-classification chart as a framework for expository writing.

Moving Intermediate students further up the growth strand for literary descriptive writing has interesting research potential. In the study presented in this paper, emphasis was placed on the

sub-sub-categories identified in the tree-diagram in order to compose a descriptive paragraph. Writing about a person, object or event could develop into a description including several paragraphs if the students were taught to use the ideas in the sub-category "bubbles" as topics for several paragraphs. The necessary steps in the instructional sequence to achieve this end point have yet to be developed.

A critical area for research that holds far reaching implications for education in general, not just for writing, is the investigation of the effect of teaching problem solving in other subject areas on learning the kind of writing strategy proposed in this study.

BIBLIOGRAPHY

Banks, Lois et al.

1978 Research Study Skills. College of Education, Brock University and Niagara Centre, Ontario Institute for Studies in Education.

Bereiter, Carl.

1978 Development in Writing. Toronto: Ontario Institute for Studies in Education.

Bereiter, C., Scardamalia, M.

1978 Five Principles of Cognitively Based Writing Instruction. Toronto: Ontario Institute for Studies in Education.

(in press) From conversation to composition: the role of instruction in a developmental process. Advances in Instructional Psychology. Vol. 2. Hillsdale, N.J.: Erlbaum.

Braddock, R., Lloyd-Jones, R., Schoer, L.

1963 Research in Written Composition. Urbana, Ill.: National Council of Teachers of English.

Britton, J., Burgess, T., Martin, N., McLeod, A., Rosen, H.

1975 The Development of Writing Abilities (11-18). London: Macmillan Education.

Cooper, Charles R.

1975a Measuring growth in writing. English Journal, 64: 111-120.

1975b Responding to student writing. The Writing Processes of Students. Buffalo: State University of New York at Buffalo.

Dixon, John.

1969 Growth Through English. London: Oxford University Press.

Emig, Janet.

1971 The Composing Processes of Twelfth Graders (NCTE Research Report No. 13). Urbana, Ill.: National Council of Teachers of English.

Flower, L.S., Hayes, J.R.

1977 Problem-solving strategies and the writing process. College English, 39:449-461.

Gagne, R.M., Foster, H., Crowley, M.

1948 The measurement of transfer of training. Psychological Bulletin, 45: 97-130.

Graves, D.H.

1975a An examination of the writing processes of seven year old children. Research in the Teaching of English, 9: 227-241.

1978 Balance The Basics: Let Them Write. New York: Ford Foundation.

1975b The child, the writing process, and the role of the professional. The Writing Processes of Children. Buffalo: State University of New York at Buffalo.

Hart, L.A.

1978 The new 'brain' concept of learning. Phi Delta Kappan, 59: 393-396.

Hayes, John R.

1978 Thinking and Creating: An Introduction to Cognitive Psychology. Homewood, Ill.: Dorsey Press.

Haynes, P., Evans, P.

1979 Analysis of Writing - 1979 Grade 7-8 (Intermediate Writing Evaluation Project). Toronto: Ontario Institute for Studies in Education.

Hunt, J. McV.

1961 Intelligence and Experience. New York: Ronald Press Co.

Kohl, Herb.

1967 Teaching the Unteachable. New York: New York Review.

Lindsay, H.L., Norman, D.A.

1972 Human Information Processing. New York: Academic Press Inc.

MacDonald, Hugh.

1975 Ongoing formative evaluation of student writing. The Writing Processes of Students. Buffalo: State University of New York at Buffalo.

McMaster, R.J.

1965 The Craft of Writing. Don Mills, Ont.: Longmans Canada Limited.

Meckel, H.C.

1963 Research on teaching composition. Handbook of Research on Teaching. American Education Research Association, Chicago: Rand, McNally and Co.

Mischel, Terry.

1974 A case study of a twelfth-grade writer. Research in the Teaching of English, 8: 303-314.

Moffet, James.

1979 Integrity in the teaching of writing. Phi Delta Kappan, 61: 276-9.

Murray, Donald M.

1978 Internal revision: a process of discovery. Research on Composing. Urbana, Illinois: National Council of Teachers of English.

Odell, Lee.

1974 Measuring the effect of instruction in pre-writing. Research in the Teaching of English, 8: 223-240.

1973 Piaget, problem-solving, and freshman composition. College Composition and Communication, 34: 36-42.

O'Hare, Frank.

1971 Sentence Combining: Improving Student Writing Without Formal Grammar Instruction. (NCTE Research Report No. 15). Urbana, Illinois: National Council of Teachers of English.

Osgood, C.E., Suci, G.J., Tannenbaum, P.H.

1957 The Measurement of Meaning. Urbana, Illinois: University of Illinois Press.

Parke, Margaret B.

1961 Composition in primary grades. Children's Writing: Research in Composition and Related Skills. Champaign, Illinois: National Council of Teachers of English.

Popp, L.A., Robinson, F.G., Robinson, J.P.

1974 Basic Thinking Skills. Niagara Centre: Ontario Institute for Studies in Education.

Popp, L.A.

1978 Basic Thinking Skills: Informational Organizers. St. Catharines, Ont.: College of Education, Brock University.

1979 Basic Thinking Skills: Informational Writing. St. Catharines, Ont.: College of Education, Brock University.

Robinson, F.G., Hedges, H.G., Popp, L.A., Clipsham, J.

1977 ICPOGMU: A System of Curriculum Development. Northeastern Centre, Ontario Institute for Studies in Education.

Robman, D.G., Wiecke, A.O.

1964 Pre-Writing: The Construction and Application of Models for Concept Formation in Writing (USOE Cooperative Research Report No. 2174). East Lansing, Michigan: Michigan State University.

Sawkins, Margaret.

1975 What children say about their writing. The Writing Processes of Students. Buffalo: State University of New York at Buffalo.

Siegel, Betsy D.

1975 The writing process in the open classroom. The Writing Processes of Students. Buffalo: State University of New York at Buffalo.

Squire, J.R.,

1975 Composing - a new emphasis for the schools. The Writing Processes of Students. Buffalo: The State University of New York at Buffalo.

Stollard, Charles K.

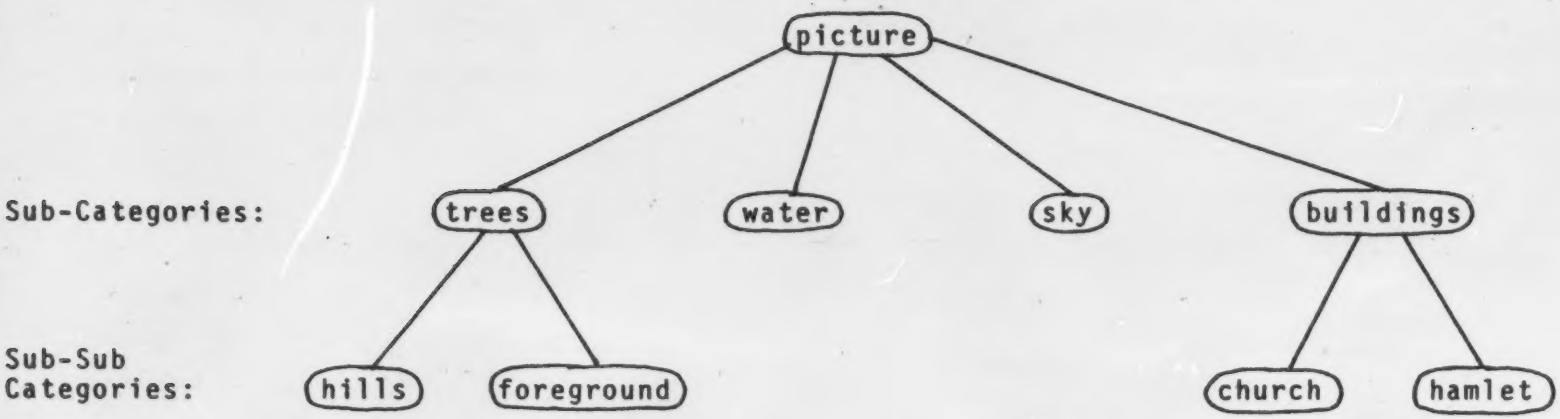
1974 An analysis of the writing behaviour of good student writers. Research In The Teaching of English, 8: 206-218.

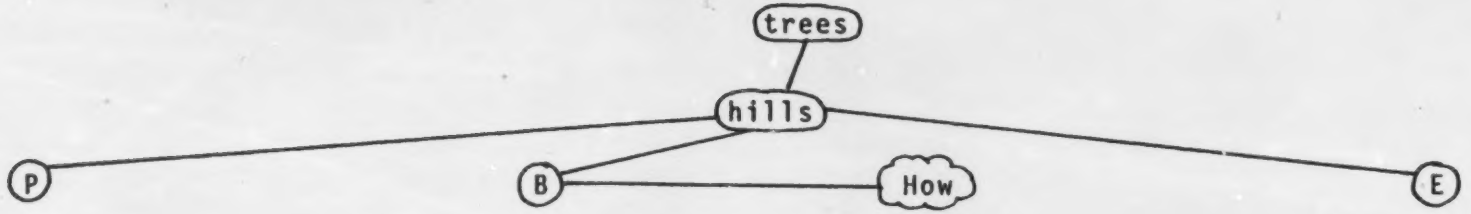
Young, R.E., Becker, A.L., Pike, K.L.

1970 Rhetoric: Discovery and Change. New York: Harcourt, Brace and World, Inc.

APPENDIX 1

COMPLETED TREE-DIAGRAM ORGANIZER FOR PICTURE USED FOR TREATMENT GROUP POST TEST DESCRIPTIVE PARAGRAPHS


picture
Sub-Categories:
trees
water
sky
buildings
Sub-Sub
Categories:
hills
foreground
church
hamlet

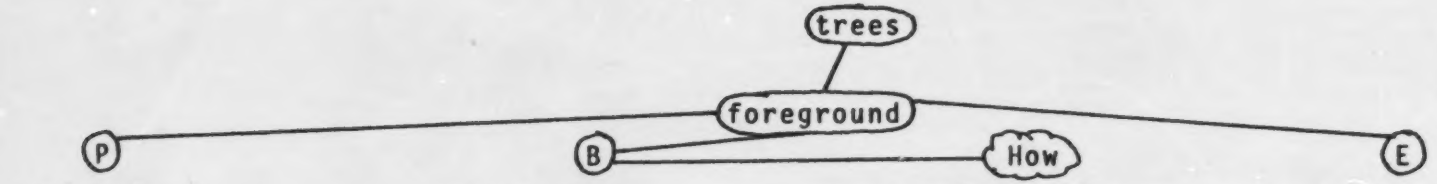


-slashed
-painted
-streaked
-luxuriant
-dazzling
-tall
-bushy
-lush
-dense
-colourful
-orange
-autumn
-golden
-colour-splashed
-patchy
-rusty
-like a patchwork quilt
-like a sponge painting
-like a fireworks display
-like an autumn rainbow

-surround
-cover
-like a carpet
-like a blanket
-cloaks
-like a shawl
-wraps
-shelters
-dazzles
-hypnotizes

-peacefully
-lovingly
-carefully
-gently
-completely
-colourfully
-fascinatingly
-placidly
-charmingly
-silently
-calmly

-beside the water
-on the rolling hills
-around the hamlet
-down to the hamlet
-silhouetted against the blue sky
-in the valley

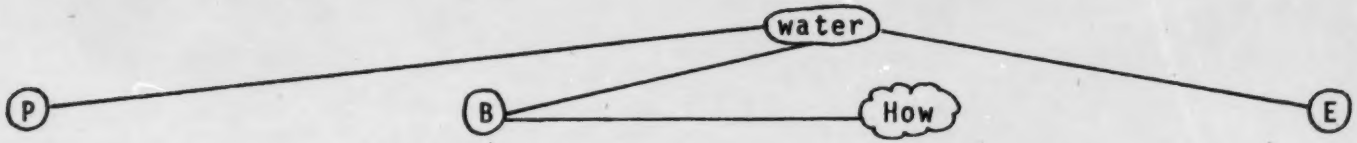


-painted
-slender
-branches
-tall
-many branched
-spidery arms
-orange
-green
-dark branches
-falling leaves
-like raindrops
-sparse foliage
-like long fingers
-like bony arms

*suggest
*invite
-droop
-like a tired old man
-dropped
-reach(ing)
-wave
-rustle
-sway
-casts a reflection
-fall
-leans
-bends
-sheds
-like parachutes
-heralds the coming season

-colourfully
-peacefully
-gently
-quietly
-noiselessly
-softly
-carelessly
-gracefully
-slowly
-pleasantly
-beautifully
-calmly
-with a splash of colour

*-sense of:
* sleepiness
* tranquillity
* peacefulness
-toward the water
-by the water
-in the autumn air
-on the brink of the stream
-into the water
-in the breeze

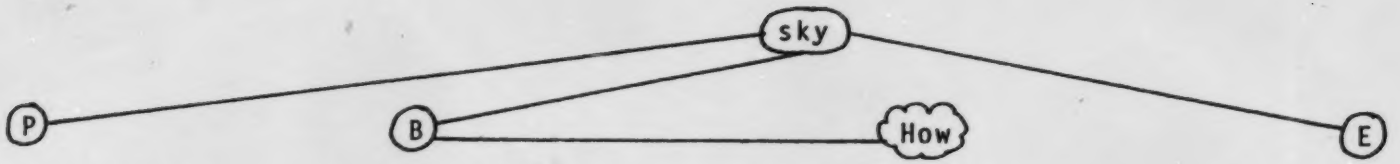


-painted
-blue
-clear
-undisturbed
-mirror-like
-shimmering
-shiny
-cool
-calm
-motionless
-rippled
-slow moving
-pleasant
-glassy
-placid
-green
-turquoise

-reflects
-flows
-shines
-shimmers
-dazzles
-like a mirror
-like a cluster of diamonds
-like a sheet of glass

-calmly
-slowly
-peacefully
-pleasantly
-silently
-noiselessly
-tranquilly
-serenely
-brightly
-sparklingly
-smoothly
-colourfully

-by the shore
-near the hamlet
-in the valley
-surrounded by trees
-at my feet
-autumn scene



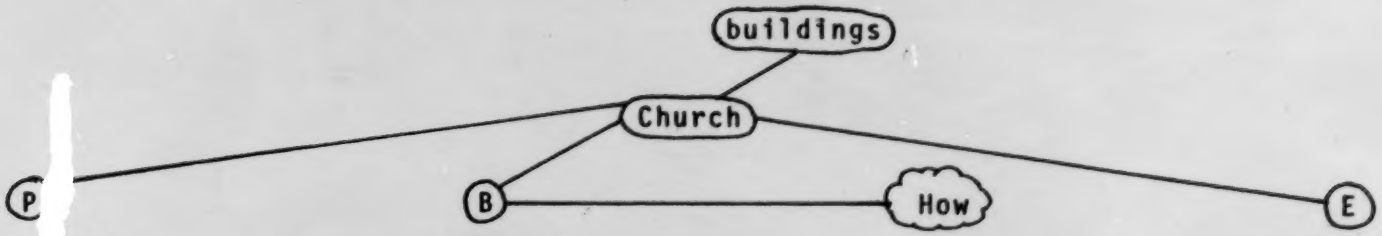
-like a peaceful oasis
-blue
-glossy
-cloudless
-tranquil
-motionless
-infinite
-glowing
-polished
-sparkling
-suspended
-azure
-bright
-like an ocean
-like an endless well

*-summons
-casts a reflection
-invites
-suggests
-like a magician casting a spell

-peacefully
-quietly
-serenely
-colourfully
-calmly
-silently

*-dreaminess
-tranquility
-peacefulness

-in me
-in the viewer
-in the still air

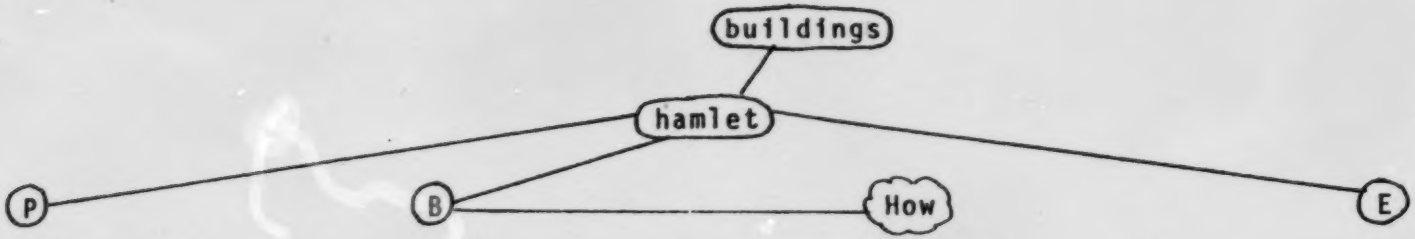


-old
-white
-hushed
-small
-wooden
-painted
-spired
-bell tower
-holy
-miniature
-tiny
-peaceful
-distant
-chimes

-casts(ing) a reflection
-welcome(ing)
-invites(ing)
-calls upon
-chimes
-echo
-reach
-trying to reach the heavens

-gladly
-cheerfully
-restfully
-musically

-by the lake
-on the shore
-at the base of the hill
-in the valley
-surrounded by trees
-to the sky
-in the still autumn air



-like a paradise
-at the end of the rainbow
-like an island
-secluded
-old
-white
-weather-beaten
-isolated
-wooden
-shaded
-protected
-quiet
-serene
-tranquil
-hushed

-nestle
-hide
-conceal
-calls up
-invites
-suggests

-peacefully
-quietly
-tranquilly
-silently
-noiselessly
-contentedly

-among the trees
-warm feelings of
  -security
  -comfort
  -peace
  -belonging

APPENDIX 2

SAMPLES OF PRE AND POST TEST DESCRIPTIVE PARAGRAPHS FOR CONTROL AND TREATMENT GROUPS

A SAMPLE OF CONTROL GROUP, BELOW AVERAGE, PRE TEST, DESCRIPTIVE PARAGRAPH

In the picture there are two houses and one church and one barn. On the left side of the picture their is a river. On the right side of the picture their is a forest. The sky is two shades of blue a light blue and a lighter blue. Behind the river are some trees. Beside the river there are some trees. The colour of the leaves are red, orange, green, brown. The river has two colour of green, blue. The sun always shines on the houses.

A SAMPLE OF CONTROL GROUP, BELOW AVERAGE, POST TEST, DESCRIPTIVE PARAGRAPH

The spacious blue sky hung over the colourful autumn trees. The large mountain hung over the small town. The wind rippled over the sparkling lake. Overlooking the lake a church with a tall steeple sits on the hillside. The trees on the mountains were spread evenly. The quaint farmhouses were barely visible in the midst of the trees.

A SAMPLE OF TREATMENT GROUP, BELOW AVERAGE PRE TEST DESCRIPTIVE PARAGRAPH

The picture of the lake has a cabin on one side and has another house beside it. The lake is surrounded with trees. I't has tons of orange leaves around the sides of the lake. I'n the middle it is clear, with a glimpse of sunlight on it.

A SAMPLE OF TREATMENT GROUP, BELOW AVERAGE, POST TEST DESCRIPTIVE PARAGRAPH

As I was walking over the hills and through some brush and trees. I saw what looked like a flying saucer, it was shiny but as I got close it looked like an oasis in heaven. The sky was blue and cloudless. It was motionless and glowed like it had been polish-

ed. The hills around me were surrounded by rusty colourful autumn shades. The trees looked like they were painted every leave showing beauty, and the tree swayed it as if it were alive and trying to tell me something. Like a mirror the torgois water was coulorfully reflecting the azur sky. It was glossy motionless. It was as though it was painted blue it was coulorful and stood still by the shore, it was near the hamlet. The hamlet was old and hushed, the water could have knocked it over, but the neat shaped place seemed protected by something. And the church beside the hamlet was old white and small the bell tower was casting a reflection it was peaceful like it was trying to reach the heavens. I think I'l come to the peaceful coulorful valley more often.

A SAMPLE OF CONTROL GROUP, AVERAGE, PRE TEST DESCRIPTIVE PARAGRAPH

Once upon a time there was a place, and in this place there was a town and in that town there was a church with a tall steeple and also 4 houses. this town was at the foot of some big hills with lots of trees on it. in front of the town there is a lake, on the bank of the lake there are some trees.

A SAMPLE OF CONTROL GROUP, AVERAGE, POST TEST DESCRIPTIVE PARAGRAPH

Over looking the lake is a church, a house and a barn. In back of them is a big tree covered hill. the leaves are falling peacefully off the trees. The sky above is cloudless and blue. The wind is making small ripples in the clear blue lake.

A SAMPLE OF TREATMENT, AVERAGE, PRE TEST DESCRIPTIVE PARAGRAPH

One day I decided to go sailing thith my friends, Carol,Christy

and Sherry. I phoned them up, they were all allowed to go. They came to my house and we set off. It was a beautiful day, sunny warm with a little breeze. We ate lunch on the boat. This boat was my fathers it is a house boat. We decided that we would stop on a little island that was located just a little south of the rout we were sailing. The strange thing was that when we looked on the map to see where we were we could not see an island situated on the map. We decided to go there anyway. My father always told me if we ever see an island that were not sure of take the loaded gun on the gunrack on the boat by the bed. We came closer to the unknown island. Christy said "lets go outside for some fresh air we have been inside almost all day". I said "wait, I will get the gun incase we run into trouble". So I went to get the gun. "Its not here" I cried where could it be? Darn I bet I left it in the house while I was polishing it! "Does that mean we can't go on the island" said Carol? By this time Christy was already outside, she came back in the boat running towards us. I thougt something was wrong or she seen something she finally said "it's beautiful"! We didn't know what she was talking about. We gave here a weird look and then she said the island. Sherry said "Were hear". Then we all dashed for the door. It was the most beatiful place in the world. On the island there was a little church, a house and a barn. We tied the boat to a tree and then slowly and cautiously made our way to the house. We knocked and knocked but nobody answered. Then we checked the barn there were only a couple of cows and four beatiful horses in the barn. There was nobody in sight then we decided to check the little church. There was nobody there either. The strange thing about this was that the animals had fresh food. We finally found a little lady wadling around the back of the church. "Hello" she said. We said

"Hi". She was a nice old lady. "Where do you girls come from" she asked. "We come from Florida, St. Petersburg Florida" Christy replied. "Why isn't this island located on the map?" Asked Sherry. Nobody knows about it she said. It is very nice said Carol. I know I live here alone. The little lady was really nice we stayed there for about four hours and then had to head for home because it became dark. After that day we visited the old lady every day we could. We became good friends.

A SAMPLE OF TREATMENT, AVERAGE, POST TEST DESCRIPTIVE PARAGRAPH
As I approached the hushed serene hamlet I noticed that it was nestled contently amoung the trees. It looked like paradise at the end of an autumn rainbow. Then I couldn't help but noticing the old well cared for church. It was situated by the water's edge. Then I could here faint musical chimes. They chimed one time. It was one o'clock already. As I shifted I saw that the duo toned water serounded me and began to ripple with the movements of the wind. Then I turned and I saw that the distant trees cloaked the hills completely and looked like a patchwork quilt because of the autumn colour splashed leaves. Then I looked overhead and saw the azure sky suggesting tranquility and casted a reflection in the motionless water. I couldn't help but noticing the trees in the foreground. Like orange tear drops of joy leaves detached themselves from the slender branches of the tree's. The leaves spun to the ground and began to rustle gently about the trees, like children happily playing tag. As I walked, the quiet little hamlet faded away into the distance.

A SAMPLE OF CONTROL, ABOVE AVERAGE, PRE TEST DESCRIPTIVE PARAGRAPH

The day is lovely. The sky is a clear blue, without a cloud in sight. The fall leaves made a combination of red, orange, yellow, light brown and green. On the calm lake was the reflection of the blue sky and the brightly coloured trees. And on the lakes shore was a white church with a tall steeple, two houses and an old barn. The hill behind the small village is covered with the changing leaves.

A SAMPLE OF CONTROL, ABOVE AVERAGE, POST TEST DESCRIPTIVE PARAGRAPH

It was a bright autumn day the beautiful blue water just glittered as the suns beams hit the edge of the water. The clear blue sky touched the top of the colourful trees that hung off the sides of the gigantic hills. The reflection of the trees showed clearly on the small lake. Across the water there is a small cream coloured church with a high steeple souround by a little cream coloured house and a small brown barn.

A SAMPLE OF TREATMENT, ABOVE AVERAGE, PRE TEST DESCRIPTIVE PARAGRAPH

It is a warm day in fall, the clear blue water in the peaceful lake was shimmering quietly. As it washes up on the tip of the sandy enticing shores the panoramic view of the elegant mountains and trees comes in view. The tinted leaves of the maple and spruce are so invigorating that they reflect their beauty into the lake. Calmly the turquos blue sky gives the captivating, portrait an attractive finish.

A SAMPLE OF TREATMENT, ABOVE AVERAGE, POST TEST DESCRIPTIVE PARAGRAPH

Somewhere in the Rocky Mtns. of B.C. is a small peaceful valley which is isolated from the rest of the world by miles of colourful trees. The rustling trees on the rolling hills look like autumn rainbows which are surrounding the hamlet. Tall and slender the painted trees on the foreground shed their beautiful leaves as they suggest the change in season. Reflecting the pleasant autumn scene, the powder blue lake shimmers silently as it washes smoothly upon the sandy shore. Like a magician casting a spell the cloudless glossy sky could summon a person into tranquility. This glowing mass of blue seems as if it is falling endlessly behind the tree covered hills. Enclosed by the lush trees, rippling lake, and the polished sky, the miniature colony of buildings, set seemingly helplessly, like a mouse in a trap. Part of this small town is made up of an old white village which is nestled securely among the luxuriant trees. Cheerfully welcoming new comers, the church's holly bell tower chimes musically as it sits serenely by the quiet town. This placid little valley gives out warm feelings of comfort and joy, As I turn the page of my book, I hope I will be able to visit this place some time.

APPENDIX 3

SCORING SHEET FOR HOLISTIC AND ANALYTICAL EVALUATION OF CONTROL AND TREATMENT GROUP DESCRIPTIVE PARAGRAPHS ON THREE VARIABLES

Rater's Name _____ Paragraph No. _____

I GENERAL IMPRESSION

1. 1—Poor 2—Fair 3—Good 4—Very Good ( )

TOTAL ____/4

II THOUGHT ORGANIZATION

2. Main Impression:

0—Not Established 1—Stated Not Supported 2—Some Detail Support 3—Most Detail Support 4—Well Conveyed ( )

3. Sub-Categories:

0—None 1—Some 2—Most 3—All ( )

4. Sub-sub Categories:

0—None 1—Some 2—Most 3—All ( )

TOTAL ____/10

III DESCRIPTIVE ELEMENTS

5. Active Verbs:

0—None 1—Poor 2—Fair 3—Good 4—Very Good ( )

6. Specific Nouns:

0—None 1—Poor 2—Fair 3—Good 4—Very Good ( )

7. Adjectives:

0—None 1—Poor 2—Fair 3—Good 4—Very Good ( )

8. Adverbs:

0—None 1—Poor 2—Fair 3—Good 4—Very Good ( )

9. Phrases:

0—None 1—Poor 2—Fair 3—Good 4—Very Good ( )

10. Clauses:

0—None 1—Poor 2—Fair 3—Good 4—Very Good ( )

11. Similes:

0—None 1—Poor 2—Fair 3—Good 4—Very Good ( )

12. Metaphors:

0—None 1—Poor 2—Fair 3—Good 4—Very Good ( )

TOTAL ____/32

APPENDIX 4

WRITING ATTITUDE SURVEY QUESTIONNAIRE

Name: _____

Grade: _____

The following questionnaire has been developed as a means of determining your attitude toward creative writing. Each question contains a statement followed by a series of words with opposite meanings. Read the statement and decide how you feel about it. Then place an 'X' in one of the blanks between each of the pairs of opposite words that follows that statement. The 'X' should be placed in the blank space that would best indicate your feeling about the statement as described by each pair of opposite words.

There are no right or wrong answers.

SAMPLE QUESTION

A. Writing is:

1.	easy	_____	_____	_____	_____	_____ hard
2.	no fun	_____	_____	_____	_____	_____ fun
3.	nice	_____	_____	_____	_____	_____ awful
4.	unpleasant	_____	_____	_____	_____	_____ pleasant
5.	good	_____	_____	_____	_____	_____ bad
6.	boring	_____	_____	_____	_____	_____ interesting

A. Usually when I have to do any writing I feel:

1. good _____ _____ _____ _____ _____ bad
2. unhappy _____ _____ _____ _____ _____ happy
3. awful _____ _____ _____ _____ _____ nice
4. calm _____ _____ _____ _____ _____ irritated
5. sad _____ _____ _____ _____ _____ glad
6. positive _____ _____ _____ _____ _____ negative

B. Thinking about what I want to say before I write, makes me feel:

7. sure ____ ____ ____ ____ ____ unsure
8. unpleasant ____ ____ ____ ____ ____ pleasant
9. awful ____ ____ ____ ____ ____ nice
10. easy ____ ____ ____ ____ ____ uneasy
11. insecure ____ ____ ____ ____ ____ secure
12. comfortable ____ ____ ____ ____ ____ uncomfortable

C. Writing a descriptive paragraph is:

13. pleasant _____ _____ _____ _____ _____ unpleasant
14. good _____ _____ _____ _____ _____ bad
15. awful _____ _____ _____ _____ _____ nice
16. fun _____ _____ _____ _____ _____ no fun
17. interesting _____ _____ _____ _____ _____ boring
18. hard _____ _____ _____ _____ _____ easy

D. Putting my thoughts down on paper is:

19. easy _____ _____ _____ _____ _____ hard
20. awful _____ _____ _____ _____ _____ nice
21. good _____ _____ _____ _____ _____ bad
22. unpleasant _____ _____ _____ _____ _____ pleasant
23. fun _____ _____ _____ _____ _____ no fun
24. boring _____ _____ _____ _____ _____ interesting

E. Planning and organizing my ideas on paper before I write is:

25. bad ____ ____ ____ ____ ____ good
26. helpful ____ ____ ____ ____ ____ not helpful
27. useless ____ ____ ____ ____ ____ useful
28. important ____ ____ ____ ____ ____ unimportant
29. not valuable ____ ____ ____ ____ ____ valuable
30. profitable ____ ____ ____ ____ ____ unprofitable

F. Playing with language in order to convey a message in the most effective way to my reader is:

31. good _____ _____ _____ _____ _____ bad
32. boring _____ _____ _____ _____ _____ interesting
33. nice _____ _____ _____ _____ _____ awful
34. no fun _____ _____ _____ _____ _____ fun
35. pleasant _____ _____ _____ _____ _____ unpleasant
36. hard _____ _____ _____ _____ _____ easy

G. Having a writing plan to follow is:

37. bad ____ ____ ____ ____ ____ good
38. important ____ ____ ____ ____ ____ unimportant
39. not helpful ____ ____ ____ ____ ____ helpful
40. useful ____ ____ ____ ____ ____ useless
41. unprofitable ____ ____ ____ ____ ____ profitable
42. valuable ____ ____ ____ ____ ____ not valuable

H. When I plan before I write, my writing is:

43. nice _____ _____ _____ _____ _____ awful
44. worse _____ _____ _____ _____ _____ better
45. organized _____ _____ _____ _____ _____ unorganized
46. bad _____ _____ _____ _____ _____ good
47. interesting _____ _____ _____ _____ _____ boring
48. inferior _____ _____ _____ _____ _____ superior

I. Being able to write well is:

49. valuable ____ ____ ____ ____ ____ not valuable
50. useless ____ ____ ____ ____ ____ useful
51. worthwhile ____ ____ ____ ____ ____ not worthwhile
52. unimportant ____ ____ ____ ____ ____ important
53. necessary ____ ____ ____ ____ ____ unnecessary
54. not helpful ____ ____ ____ ____ ____ helpful

J. I feel that being taught how to plan well is:

55.	important	____	____	____	____	____ unimportant
56.	boring	____	____	____	____	____ interesting
57.	good	____	____	____	____	____ bad
58.	useless	____	____	____	____	____ useful
59.	valuable	____	____	____	____	____ not valuable
60.	not worthwhile	____	____	____	____	____ worthwhile